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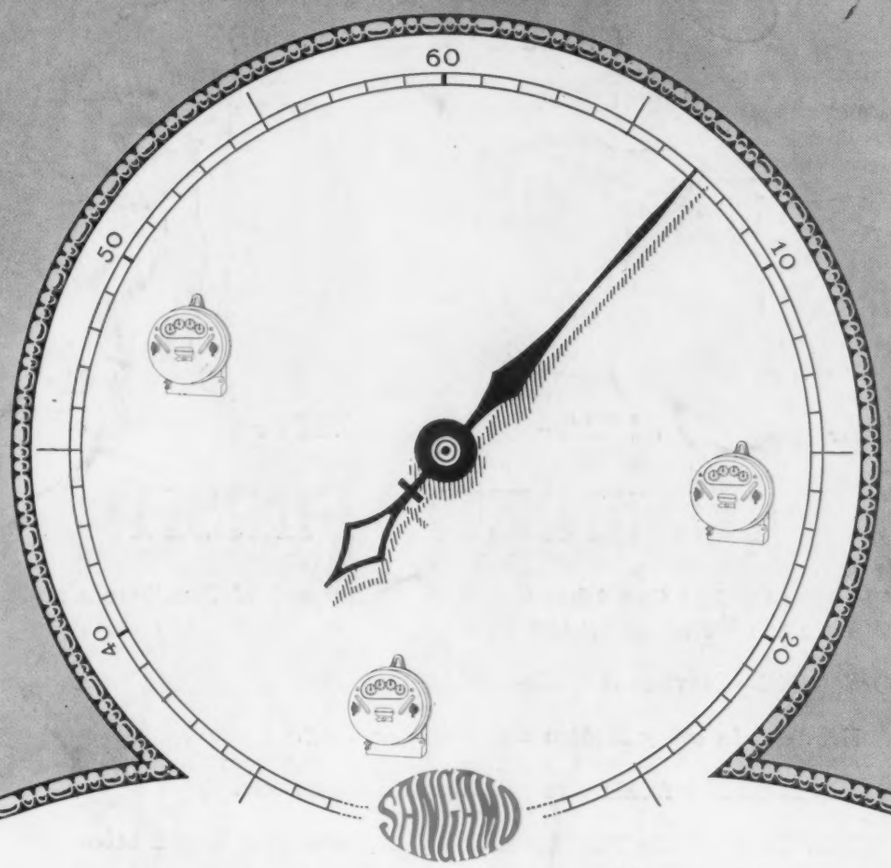
Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES



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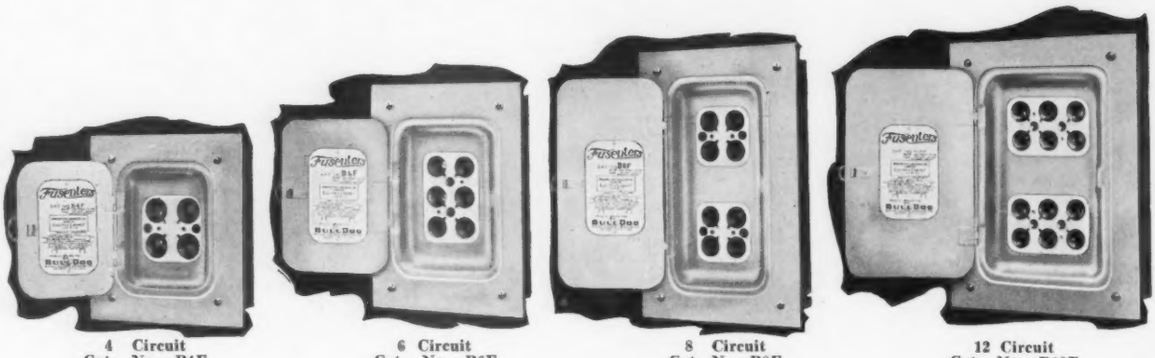

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IN THE ELEVEN WESTERN STATES

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Here Is a Record

A sales record which demonstrates the net results of directly applying the McGraw-Hill "Four Principles of Industrial Marketing" is the subject of the sixth of a series of full-page advertisements which are being run in the principal newspapers of the country by the McGraw-Hill Company. The attention of our readers is called to the reproduction of this advertisement which appears on pages 44 and 45 of this issue.

The story of the remarkable success of the producer of an important raw material whose experience is cited proves the need for a higher industrial sales efficiency. Better industrial selling was accomplished by this manufacturer through the application of the following four principles in which the McGraw-Hill Company is trying to arouse a keener appreciation on the part of industry:

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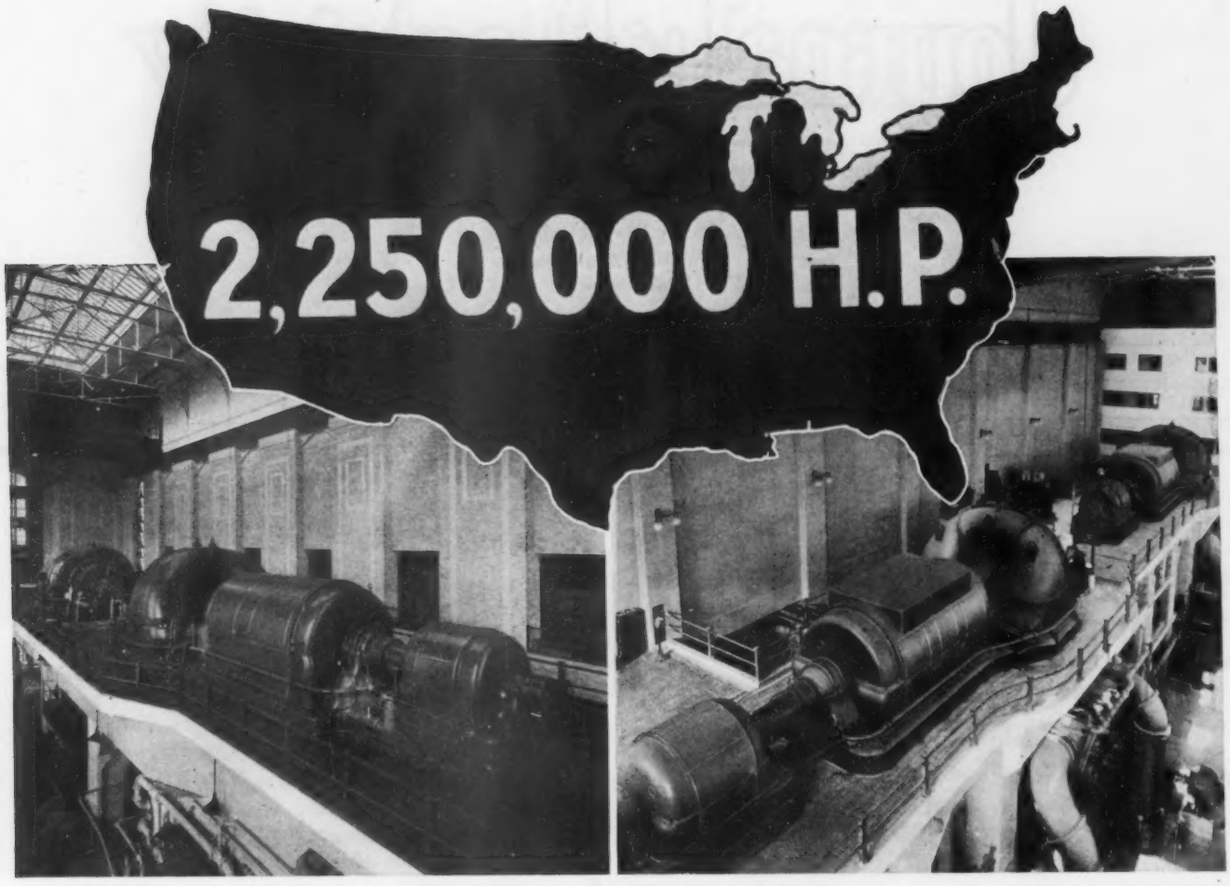
These McGraw-Hill "Four Principles of Industrial Marketing" can be applied successfully in any business which sells to industry.



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EDITORIAL

Half-Truths Are Often Deceptive

TRUTH half-told is a dangerous and subtle weapon. It is a favorite tool of the professional politician. Witness the two innocent paragraphs appearing recently in the Hearst press under the signature of Arthur Brisbane:

"Ponca City, in Oklahoma, with 15,000 population is free from taxes. Buy your house and that is the end of it. No tax-gatherer comes around. And it's simple, as O. P. Callahan, Ponca's mayor, will tell you. The people of Ponca City own their light and power departments, managed with the municipal water works. Profit on the city's light, water and power plant is sufficient to pay all taxes.

"How does that impress you? And please note that rates charged for water, light, and power in tax-free Ponca City are lower than in other places where citizens pay taxes and also enrich public service corporations, privately owned."

A pretty picture for the unsuspecting reader Mr. Brisbane paints. But he uses only half the facts. An investigation of the situation in Ponca City casts a shadow here and there on Mr. Brisbane's picture. Ponca City citizens are not tax-free; they pay state and county taxes as in any other town, so the tax-gatherer does function. While many of the city expenditures are met with earnings from the municipal light and water department, some are paid from tax levies. Rates are not lower than in cities served by private companies; they are well constructed and approximately the same as in other cities in that section of Oklahoma.

But there is an unusual situation that makes all this possible. Ponca City is the headquarters for one of the largest oil-refining corporations in the Southwest. The present mayor is a former vice-president of this company. The present executive vice-president of the company was formerly mayor of the city and takes an active part in municipal affairs. The city is being operated on a business basis and business men are running it.

Recently one of the large private utilities in the state was asked to examine and appraise the municipal electric system with the option of purchasing it. The present city officials realize that while the system may be making money now, there is a possibility that political management at some future date may dissipate all earnings.

Thus the case of Ponca City, Oklahoma, is not all that Mr. Brisbane would have his readers believe. Had he revealed all of the facts his picture would not have been so rosy. Our only regret is that all of the millions of readers of Mr. Brisbane's column will not know the facts as they are published here.

One Genuine Method of Solving the Automobile Headlight Problem

POSSESSION of a little card, signifying that the bearer thereof has expended seventy-five cents to have his automobile headlights tested and adjusted, has not solved the problem of automobile headlight glare. On paper the theory sounds very well, but in practice there are a number of conditions which shake its security. Every road bump, every car track, every vibration constitutes one of these mitigating conditions.

It is not enough to conform to the letter of the law once or twice a month by visiting headlight-testing stations. It helps the motorist who has to look into glaring headlights not one whit, if after leaving the testing stand, a jar or twist will leave the lights of any given car in position to blind everyone into whose range they come. No amount of legislation nor even of testing and adjusting can prevent glare from strong headlights along rolling roadbeds.

Like many another panacea, the remedy has been applied to the effect rather than the cause. Even if enforcement of the law were 100 per cent, which it can hardly ever be—it would keep too many police officers up too many nights—the fact remains that roads are not ideal in contour, and lamps do get out of adjustment from any or many of a variety of causes. Even perfect adjustment does not prevent a car coming up over a rise in the road from sending its perfectly focused rays full into the eyes of drivers approaching on the other side.

Yet there is a way to remedy the condition that is not dependent on law enforcement. It is much more simple and a thousandfold more effective. It consists of illuminating the highways scientifically.

Regardless of road conditions, regardless of the condition of the apparatus of the individual cars that traverse them, scientific highway lighting will be uniform, will be good, and will shed its rays alike upon the just and the unjust, a no mean factor in itself.

The idea carries with it commercial possibilities to the electrical industry, naturally, but more than that it will bring satisfaction that the problem is being solved in the best and most sensible way. The success of street lighting, where illumination has been the chief object sought rather than mere ornament, has brought forth as a by-product this vision of highway illumination potentialities. That the headlights of an automobile are practically unnecessary on well lighted streets has suggested that highways might be made safe in the same manner.

The electrical industry is not the only one which

will profit from highway illumination. Tests made recently on a stretch of highway in the East have demonstrated actually by count that without altering the highway traffic could be increased 100 per cent by having them well lighted. Practically all the trucking load upon highways is carried at night. With well lighted highways the amount of trucking over highways can be increased 100 per cent, the experiment proved, and the highways still remain safe for traveling motorists.

Compared to the investments being made in safety devices, road-widening, and parallel road-building, the investment required to light adequately the main trunk highways of the state would be very small. On such highways, driving with full-intensity headlights would not only constitute a misdemeanor—it would be absolutely uncalled for.

Speed the day when the West's highways will be lighted safely at night, that day in which traffic will demand so much more of them.

Importance of Public Relations and Sales Departments

THOSE who enjoy a background of twenty years experience or more in the electrical industry have noted with increasing interest the growing importance of the sales and public relations departments of the central stations. About the beginning of the twentieth century when the central station idea seized upon the imagination of Western men, the only problems were finance, engineering, construction, operation and maintenance. The sales effort, so far as the disposal of the output of the plants was concerned, consisted chiefly in waging a vigorous campaign to close all of the isolated plants within the sphere of operations of the central station. This was before the state regulation of utilities began, so prices were controlled largely by the competitive conditions in each district.

As for public relations—that term had not even been invented. "The stockholders be pleased" was the motto—the public could take a chance on what was left, if anything.

Now the central stations have a real selling problem. They are engaged in selling the electric servant, in expounding its utility and many advantages, and in a most constructive way, too. Production has caught up with consumption, and beyond, so enlarged markets must be created. Then, with state regulation, the threat of industrial socialization and other symptoms of political unrest, comes the vital necessity for informing the public as to the whole story of the central station, its functions and its responsibilities to its stockholders and to those whom it serves. Enter, therefore, the salesman and the public relations expert.

Not so very long ago the central stations had a dignitary generally called the manager of the commercial department. His job was to do whatever he could and at the same time keep out of the way of general managers, chief engineers and others of real importance, and if he succeeded in shutting down an occasional gas engine, he had done his job. Now we have vice-presidents in charge of sales and public relations with highly skilled staffs under them. They are becoming more and more important every day. Truly, these two departments are the fastest growing divisions in the central station industry, and would appear to offer the best possibilities for the young man who desires to make this his life work.

"What Is Success?"

TO succeed is an ambition harbored by almost every man, but few will offer the same definition of success. In a recent national contest conducted by the Western Electric Company through the columns of its house organ, "Western Electric News," C. L. Huyck, of the San Francisco office of the company, was awarded first prize for his answer to the question, "What is Success?" Mr. Huyck's answer is printed here, first because it merits careful reading by our subscribers, and second, because the honor he has won deserves recognition. His definition of success follows:

"Ten square miles of shell craters and 10,000 men wound like red yarn upon the barbed wire—that's Success for the General.

"A dinosaur's egg in the wind-blown Mongolian desert; a new census for each millionth of an inch—that's Success for the Scientist.

"A whole countryside on a printed page; a rainbow of romance that arches across the centuries; thoughts or characters that inspire, assuage or profoundly move—that's Success for the Writer.

"For Success lies not only in Achievement but also in Service, and Service means Helpfulness and therefore Unselfishness. The highest Success, theoretically, would be that which carries the greatest good to the greatest number of people.

"But the lives of most of us are spent, not in the Himalayas of our dreams but in the market place.

"Therefore:

"A day's work well done; some official or personal recognition of it; health; a sense of humor; a hobby; spiritual and mental growth; a Little Gray Home in the West and a dear girl who believes in us; anchors to windward for rainy weather and a course that will land us within the harbor before sunset—that's Success, for Most of Us."

Can any more be added to this definition? We think not.

Be It Fish or Kilowatts, Politics Has the Same Effect

IT'S a far cry from fish to kilowatts but in this particular writing there is a common link—politics. Denver, the Mile-High City, has made an epicurean treat of trout; its restaurants, hotels and summer resorts feature this fish to the delight of visitors. Hence fish farming in the vicinity of that city is a profitable business.

The state also is in the fish-farming business. Since Colorado is advertised as the sportsman's paradise, steps must be taken to keep the streams replenished with game fish. The job falls to the state fish hatchery, which is adjacent to the private trout farms in the vicinity of Denver. With this introduction the remainder of the story can best be

told in the words of one of the most successful fish "farmers."

"Mine is a profitable business; this year it will net about $15,000. I will, by the end of the season, have sold more trout than all of the fishermen in the state have taken from the streams. In addition I'll supply the state hatchery with the majority of the eggs it uses for hatching fry for restocking. Maybe I'll also sell them some of my 'spawners.'

"Down the road at the state hatchery they will spend $250,000 of the state's money this year for restocking and they will do a poor job. Why? Because they don't understand the business. Trout farming is a specialized business, with difficulties that can only be overcome after years of careful study and experience. Add to that the hazards incident to transporting trout fry from the hatcheries to the streams where they are to be planted and the problem is doubly difficult.

"Then there is the question of politics. A short time ago the commission fired the superintendent of the hatchery because he was not 'politically minded.' In the place of the man who had been in charge of the hatchery for fifteen years they appointed a successor who had never seen the inside of a fish hatchery until two weeks before he took the job. Heaven help the sportsmen and the taxpayers' $250,000."

The moral is almost too obvious, even to the layman who has never felt the tug of a half-pound rainbow on the end of an eight-ounce rod. Politics and business will not mix, be it in the raising of trout or the generation of kilowatts.

Somebody Must Sell Electrical Appliances

AS a rule when the subject of central-station merchandising comes up for discussion in the Western states other members of the industry are apt to regard it as a competitive movement jeopardizing their own interests. We are inclined to doubt very much whether central-station merchandising, wherever it is conducted, is actuated by any motive other than a necessity for load-building. Assuming this to be true, and assuming also that central-station merchandising efforts are not accompanied by destructive competition, they cannot help but prove to be a benefit to established members of the industry rather than a detriment. Any movement or campaign that attracts the attention of the consumer to the value of electrical service of necessity must be reflected in better business conditions for everybody. The central stations, however powerful they may be or however actively they may solicit, cannot obtain all the business or even a very large part of it. That central-station sales executives recognize this fact is shown clearly in recently announced campaigns in which careful attention is paid to ways and means of extending the utmost co-operation to dealers in each community where the campaign is under way.

As a further extension of this thought, a most interesting meeting was conducted in San Francisco recently under the auspices of the Great Western Power Company and the Pacific Gas and Electric Company. The attendance at the meeting was nearly 300, and a quite considerable number of these consisted of executives and salespeople from the so-called non-electrical outlets—merchandising establishments, department stores and similar institutions. Three expert salesmen, well grounded technically in their subjects, delivered lectures on the sale of electric domestic refrigerating apparatus, air and water heaters and electric ranges. The interest that was evinced by the audience is a healthy sign of the awakening on the part of department stores and the recognition of the fact that such items soon will become commodity merchandise rather than specialties.

In general, we believe it may be stated truly that the central station does not care who sells electrical appliances so long as somebody does, but that somebody must sell them.

The Little Things That Count

IF the replacement of 50-watt lamps by 100-watt lamps seems a slight matter, consider the difference in yearly revenue from the viewpoint of increased watt-hour consumption and it becomes a matter hardly so trivial. Consider, too, that the additional revenue is gained without outlay in extension equipment, and this question of lamp replacement comes to have a real meaning.

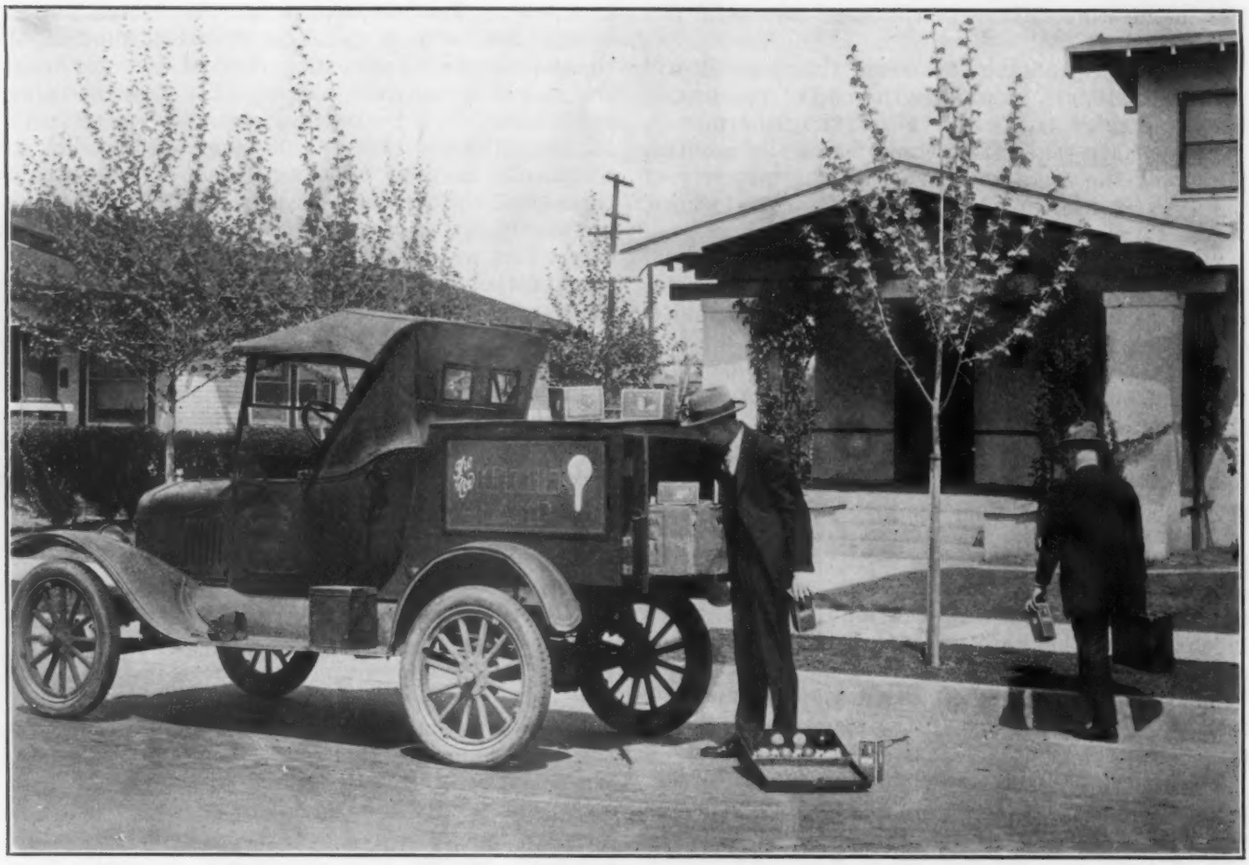
As the result of a recent lamp sales campaign, reported in this issue elsewhere, one central-station company figured that for every 100-watt lamp which took the place of a 50-watt lamp, it could count on an increase in revenue of $3.75 a year. And since in most cases the 50-watt lamp thus replaced went into another socket somewhere in the house, filling a vacancy which had existed some weeks, the matter resolved itself into one of real importance.

In the three months of its sales campaign this company's agents replaced several thousand 50-watt lamps with some of higher wattage. Added to the year's revenue, although a small item, the campaign brought a welcome addition to the load.

Safety Rules Committee to Continue its Work

COMPLETION of the Electrical Safety Orders of the California Industrial Accident Commission brought to a close the work for which the safety rules committee of the Pacific Coast Electrical Association was organized. On the eve of the dissolution of this committee it was realized that the work completed represented only the initial effort of the group. In fact these orders represent the beginning of some real work. The committee will be continued indefinitely.

Full and satisfactory application of the Safety Orders best can be accomplished through the activity of this body in assisting a common interpretation. Co-operation with the Association of Electrical Inspectors is to be an important part of the program for the coming year, and the results should be highly satisfactory.



EQUIPPED with a white kitchen lamp and a suitcase filled with various sizes and styles of lamps, each one demonstrable by means of its own socket and switch, wired so that it might be lighted from any outlet, salesmen went from door to door. Below chart showing results of a month's lamp sale in Fresno during the kitchen lamp sale.

MARCH	2	3	4	5	6	7	9	10	11	12	13	14	16	17	18	19	20	21	23	24	25	26	27	28	30	31	TOTAL	TOTAL KW	TOTAL AMT IN DOLLARS
SALESMAN	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2			
PLACES CALLED	70 69	70 74	69 66	75 91	75 77	71 55	75 70	65 62	RAIN	69 64	65 60	70 78	52 49	65 54	56 60	56 51	62 59	49 43	62 54	51 43	47 58	34 38	69 81	71 83	69 59		3014		
INTERVIEWS	26 25	20 21	23 23	20 23	22 22	25 18	23 24	20 23		25 19	23 27	25 24	18 15	25 25	26 25	25 26	26 22	25 24	30 26	20 22	30 21	25 28	30 23	30 25	30 27		1,154		
SALES MADE	23 22	14 15	15 16	16 16	15 15	19 12	16 16	14 14	RAIN	18 12	13 19	18 18	13 10	20 17	17 18	14 16	17 16	12 17	17 15	14 12	22 14	19 18	20 12	20 18	22 20	RAIN	782		
300 W CLEAR	2																										2	.6	$ 2.50
200 W CLEAR	1													1			1										3	.6	2.40
150 W CLEAR																1											1	.15	.65
100 W CLEAR				1								1					3										5	.5	2.50
100 W WHITE	26 25	29 23	26 25	25 25	28 24	24 22	25 25	26 20	RAIN	24 20	19 23	26 25	17 18	25 26	25 20	23 26	24 19	26 25	22 20	25 18	25 24	24 22	28 43	33 25	26 24	RAIN	1,168	116.8	$ 64 2.40
75 W CLEAR												1								1							2	.15	.90
75 W WHITE	7											2												4			13	.98	6.50
60 W CLEAR B					2										2						6						8	.48	2.56
50 W CLEAR B	6 1	4					1	3		2	2 1	4 6		6		6	2		18		3	1	3 12		7 6		94	4.7	25.38
50 W WHITE		2		3			6					2							4			5	1				23	1.15	9.20
40 W CLEAR B	1			8															2	1							12	.48	3.24
40 W G25 COL							1			7			1										3				12	.48	7.20
40 W G25 FR				1		4	1			6 3						6	1 6		3	1		1		3			36	1.44	18.00
25 W MT COL	14 1						2				1						2	1	1			8	2 1		2		32	.8	2.80
25 W G18½ FR										2				6	5 1		6	1 1		2	3		3		1 2		33	.825	13.20
25 W CLEAR B				1								1							1 8	6							17	.425	4.59
TOTALS	50 34	35 23	26 25	39 25	30 24	24 26	34 27	26 23		34 30	21 25	34 34	17 17	32 32	32 21	35 27	36 28	28 26	50 29	34 20	25 34	26 32	34 60	33 32	38 32		1461	30.6	$ 175 4.02

MARCH REPORT OF DAILY & MONTHLY LAMP SALES IN HOME DEMONSTRATION
VALLEY ELECTRICAL SUPPLY Co POWER Co. BLDG. FRESNO CALIF.

Better Kitchen and House Lighting Literally "Brought Home" in Fresno

WITH a special kitchen lamp in one hand and a suitcase in the other, salesmen brought better lighting to the homes of Fresno, Calif., instead of waiting for the homes to come to them for better lighting. This is a story of a campaign which yielded better lamp sales, more revenue to the central station, and best of all, increased good will and recognition from the home-owners of the community.

THAT well known metaphor, "moving the mountain to Mahomet," to use modern parlance, is "old stuff." There has been so much mountain moving, and "Mahomet" or his brethren have made so many pilgrimages to the various modern mountains that to use the expression now is to be trite. But trite or not, the recent lamp sale conducted by the Valley Electrical Supply Company, of Fresno, Calif., was just such a pilgrimage.

To carry the metaphor further, to the "mountains" of indifference and domestic unconcern went the "Mahomets" of the Valley Electrical Supply Company, carrying with them in their little fibre suitcases the means to conquer these mountains. That they did conquer, and in so facile a way, meant too that they carried the mountains back with them, mountains this time of increased good will and revenue.

H. H. Courtright, manager of the Valley Electrical Supply Company, the merchandising department of the San Joaquin Light & Power Corporation, conceived the idea that if housewives did not come to the company for better lighting the company must go to the housewives with the lighting. The idea, simple enough of itself, was not quite so simple to execute. There are a good many housewives in Fresno. To go to each one, demonstrate better lighting facilities, convince each one of its necessity, and bring back cash instead of lamps, presented a problem requiring organization and study.

When the details had been thrashed over thoroughly, the lamp sales campaign contemplated by Mr. Courtright resolved itself into a few important elements. Two salesmen were selected to be the "Mahomets," if you will. A light delivery truck on which was painted an attractive poster of "the new kitchen lamp" was placed at their service, and these two salesmen were sent forth to make house-to-house calls.

The new 100-watt white Mazda lamp was selected as the entering wedge to get the housewife's attention. It is a lamp which gives an abundance of light without glare and was found to be very effective in converting the usual poorly lighted kitchen into a bright, attractive room. It was selected also because it had been found in a previous survey that 87 per cent of the kitchens of Fresno were equipped with a ceiling flange and flat or cone reflector, wall switch, and one or more convenience outlets. Simply placing one of the new white 100-watt lamps in existing reflectors gave a kitchen the brightness of day, yet the light was free from the glare which results from the use of clear lamps. Moreover, this installation paved the way for a more adequate lighting unit later.

With the information obtained in the survey to work upon, the two salesmen and their light delivery truck went into the field to make their house-to-house calls. In making a call, each salesman carried in one hand the new kitchen lamp. In the other he carried a kit in which were shown sixteen types and sizes of lamps, including colored lamps. A stock of each of these lamps was carried in the truck. The kit resembled a fibre suitcase in appearance, but was wired with sockets and a lamp cord that could be attached to any outlet. Each lamp in the display could be lighted at will to show contrasts or effects. If a housewife selected a lamp from the kit it was taken out and delivered at once. Then the lamp was replaced in the suitcase from the stock on the truck before the next call was made.

The basis of the salesmen's approach was the introduction of a new lamp designed to meet the needs of the kitchen. This approach, coupled with the information that the lamp was being introduced by the retail sales department of the power company, opened the doors of 50 per cent of the homes called upon.

A demonstration was made quickly and the price of the lamp quoted. When mentioning the price the salesman called attention to the fact that the cost of the old lamp should be deducted, since the old lamp, usually one of 50 watts, might be placed in some empty socket and still remain in use. As a result sales were made to 50 per cent of those permitting demonstrations. As each call was made, the saleman filled out a tag giving all data necessary for future reference.

During February, March and April, calls were made on 7,705 houses. Entrance was had into 3,143 homes and sales were made in 1,987 homes. But the net results in lamp sales were not limited to

the salesmen's operations. Counter sales of 100-watt white lamps at the store jumped to 20 per cent of the number disposed of by the salesmen on their calls. Dealers throughout the city also reported an unusual demand. It may be assumed that the increased demand for the lamps came from those who had been solicited but who did not buy and from housewives in homes where entrance was not gained but who were sold over the back fence by their next-door neighbors.

The results of the campaign extended beyond the mere sale of lamps. Numerous appliances and lighting fixtures were sold, either by a salesman or as a result of his sales talk. As representatives of the power company the salesmen gave courteous consideration to complaints, reporting at once the troubles of the consumer, fancied or real, thereby promoting good will. Although intangible, the advertising value of the personal contact was felt to be considerable. Each salesman extended to every customer a special invitation to call at the attractive new store of the company.

Many sales of appliances and fixtures were made by the salesmen simply by mentioning the conveniences offered by electric irons, toasters, grills, fireless cookers, percolators, and other appliances. The suggestion that a new shade and a colored lamp would lend interest to a room frequently brought results. New fixtures were discussed. This naturally led to a description of the complete fixture display rooms of the Valley Electrical Supply Company and the service department.

Furthermore the customer's opinion of the power company service was asked for and notes were made on even the most trivial complaints. Frequently a short explanation was all that was necessary to satisfy the complainant. But the most gratifying results obtained were that the public became educated into thinking of better lighting, of the Valley Electrical Supply Company, and of the San Joaquin Light & Power Corporation whenever anything electrical was contemplated.

While the actual expense of the campaign was $200 greater than the profit derived from the lamps sold by salesmen on the streets, this deficit was more than offset by business traceable directly to the sales campaign. The profit on additional white lamps alone, sold over the counter, amounted to $105, one-half the deficit on the campaign, while sales of fixtures, appliances, convenience outlets and wiring jobs showed a satisfactory dealer's profit for the campaign. The additional revenue to be derived by the power company, on the other hand, may be seen from the following analysis:

Assuming that the average lamp replaced by the new 100-watt lamp was one of 50 watts, the gain in load to the power company was 50 watts for each new lamp installed.

Estimated Annual Revenue for Each 100-watt White Lamp Installed

Average hours of use per year	1,000
New lamp watts	100
Kw-hr. consumption per lamp per year (1,000 x 100)	100
Kw-hr. consumption per lamp per year	100
Average consumer's rate per kw-hr.	$.075
Revenue per year per 100-watt lamp	$7.50
Minus 50-watt lamp replaced	$3.75
Additional revenue per 100-watt lamp sold	$3.75

During the month of March 1,461 lamps were sold, 1,168 of which were 100-watt white kitchen lamps.

Estimated Revenue Per Year for March Sales

Total kitchen lamps sold	1,168
Additional revenue per lamp	$3.75
Total increased revenue per year	$4,380.00

This does not include probable increase from other lamps sold.

The 100-watt white lamp was sold at 55 cents, an amount which was paid in cash by 83 per cent of the purchasers. Only 17 per cent asked to have the bill charged.

The campaign is to be resumed this fall and winter, when it is expected that the success of the spring campaign will be repeated.

Using the three months of the spring campaign as a basis, it is estimated that 7,500—or 40 per cent of the homes in Fresno—will be equipped with 100-watt white lamps during the year, which should bring an increased revenue of $22,500 to the power company, in addition to stimulating interest in better lighting and building up company good will.

Open-Pit Coal Mining in Montana

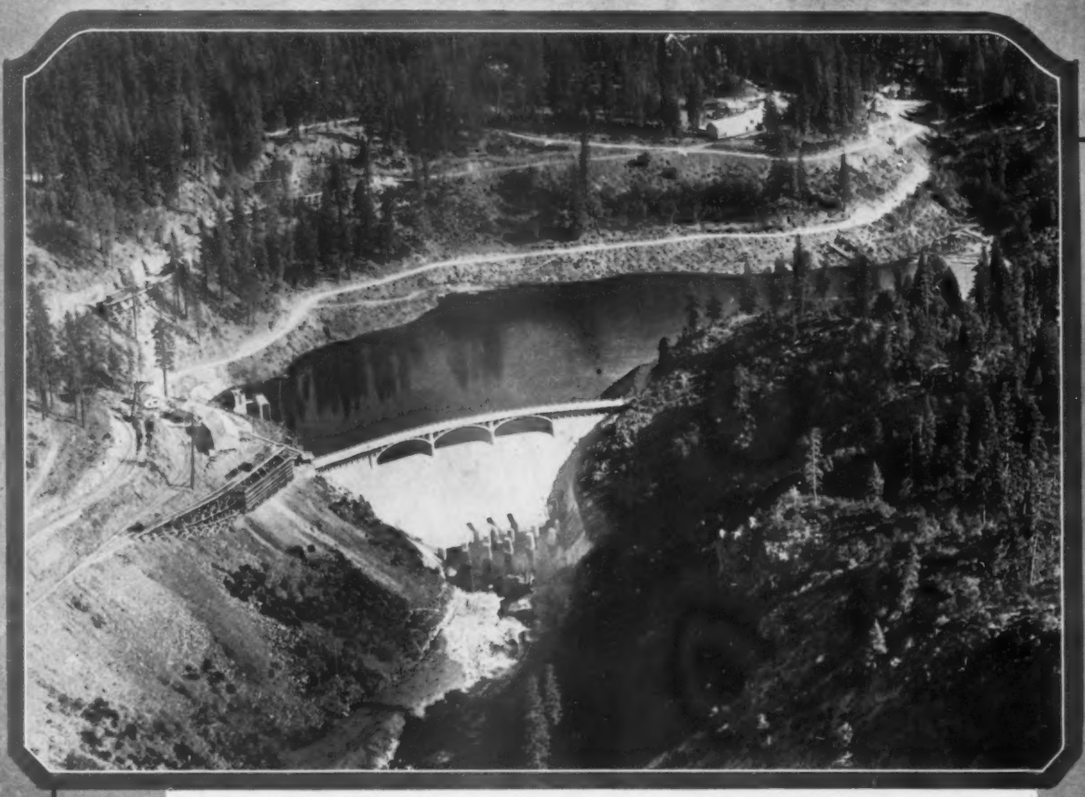
THE first completely electrified open-pit coal mine in the United States was that started recently at the newly made town of Colstrip, approximately 35 miles south of Forsyth, Mont. The coal bed, about 180 acres in extent and 25 ft. deep, contains sub-bituminous coal with a heat content of 11,000 B.t.u. The output of the mine is to be used for the locomotives of the Northern Pacific railroad in Montana.

As a result of a thorough study of the circumstances it was decided to utilize electricity in mining the coal of this bed. An extension was run by the Montana Power Company from its 35,000-volt line to the vicinity of the strip mine. Electric equipment next was procured to strip off the overburden from the coal, to mine the coal itself, and for hauling. An electric shovel for stripping, using a drag-line excavator; a coal loading shovel, and two 60-ton electric storage battery locomotives make up the equipment.

Operation of the mine is interesting. While near the shovel, with its cars ready for loading, the electric storage battery locomotives are charged from a flexible cable, running from a bank of transformers on the shovel and plugged into the locomotive. A motor generator in the cab of the locomotive thus is set in motion to recharge the storage batteries while the locomotive is idle. While coal is being mined from one strip, the overburden is being removed from the next and is cast into the excavation resulting from the removal of the coal.

Power Projects Are Spectacular from Aeroplane

KNOWLEDGE of aerial photography derived during the war rapidly is being applied in commercial channels. Chief among these applications is aeroplane surveying, a development which is readily finding a place in the study of power projects. Aerial maps have been applied widely in laying out high tension transmission lines because they afford a ready means of studying available routes and choosing a right-of-way which does not interfere with buildings, etc., and which avoids serious obstacles in the physical terrain. Aeroplane maps were used in the laying out of both the Laguna Bell line of the Southern California Edison Company and the tie-line now under construction between the systems of the Great Western Power Company and the San Joaquin Light & Power Corporation. The application of aeroplane maps to hydroelectric power projects is comparatively new. The three accompanying pictures give some idea of the spectacular conception of some of the major power developments from the air. The first shows Pit No. 1 power house, with the incoming 60-kv. line from the Hat Creek plants on the right, and the outgoing 220-kv. double circuit line in the foreground.



HOW the Pit 3 diversion dam and Lake Britton look to a bird is shown above. Below is a unique view of Pit 3 power house which gives a clear conception of the layout of this plant. The pictures were taken on the Pit River project of the Pacific Gas and Electric Company by a pilot and photographer of Aerial Surveys of California, San Francisco.

Photos copyright Aerial Surveys of California, S. F.

Methods of Preserving Poles and Economies of Pole Treatment*

By L. R. Gamble

Assistant Engineer, The Washington Water Power Company, Spokane

MR. GAMBLE'S paper, prepared as part of the report of the overhead systems committee of the Technical Section of the Northwest Electric Light and Power Association, being most complete in its treatment of a large subject, is too long to be presented here in its entirety. The extracts published are chosen with the view of presenting those parts of the paper that are apt to interest most a large number of readers.

THE steadily increasing demand by the various utilities for poles to be used for construction and replacement purposes very rapidly is depleting the timber resources of this country. This enormous demand naturally has produced a constantly decreasing supply and a constantly increasing cost of production, since the logging operations must be carried on necessarily in the more inaccessible districts. These conditions have been particularly apparent in the cedar-pole industry of the Northwest. For the past few years the Western red cedar pole has been in demand in almost every state of the Union.

This increase in the cost of poles in general has been more or less responsible in turning the pole-users to the use of pole timber which was formerly considered as less desirable, and to the use of preservatives to increase the life of poles. It is probably not fair to say that price alone has brought about this change but that along with it has been the realization of the necessity of conserving our timber resources. At any rate the result has been that many utilities are using fire-killed cedar, fir, and yellow pine poles. Also that due to the increasing demand for treated poles rapid strides are being made in developing efficient processes of preserving poles.

To show the annual increase in the demand for butt treatment of the cedar pole alone, the following statistics will be of interest. In the year 1920, 43 per cent of the Western red cedar poles sold were butt-treated by some one of the processes. In 1921 this percentage increased to 64 per cent, in 1922 to 74 per cent, and in 1924 to 90 per cent. With this increase in the number of poles treated the natural tendency has been for the pole-producer to provide as a part of his service the business of preserving poles. In the past it has been customary for the larger utilities to treat their own poles, but with the increasing demand and with the smaller companies going to the use of treated poles this business has fallen on the producer, and from the economic viewpoint the job no doubt belongs to him.

In the superficial treatments the preservative is applied to the surface of the pole, and the only penetration secured is that which occurs naturally. Among these treatments are the dipping, pouring, spraying and brush treatments. These treatments may be given on the job or at the pole yards. A detailed description of the above treatments is covered in previous reports to the association and will not be elaborated upon here. The dipping treatment is, however, one of the open-tank methods and consists in erecting the poles with their butts in a tank of hot preservative. The poles are allowed to remain in this bath 15 minutes or longer, if necessary. This treatment gives a more uniform penetration than the brush treatment. It is somewhat more expensive, however, and thus has caused some pole-users to prefer the brush treatment. Under the dipping treatment are two specifications, one known as "Specification A" and the other as "Specification AA", the only difference being that the preservative used in the former is carbolineum and in the latter, creosote.

In the impregnation treatment the commonest methods employed are the pressure method and the open-tank method. Poles treated by the pressure method have only a limited field because it must be confined to such wood as southern yellow pine, which is sufficiently permeable to afford thorough penetration. It is found that the pressure method when applied to cedar or chestnut will give very little added penetration over the open-tank method and that in the case of cedar poles they will split very badly. Another reason for the limited field is that it is very costly.

There has been developed recently the pressure method for treating the butts of poles called the localized pressure method. This method consists of placing a number of poles in a vertical tank long enough to take the entire pole and then admitting oil to the required level and carrying out the regular treatment. There is still another method being developed that uses a horizontal cylinder instead of

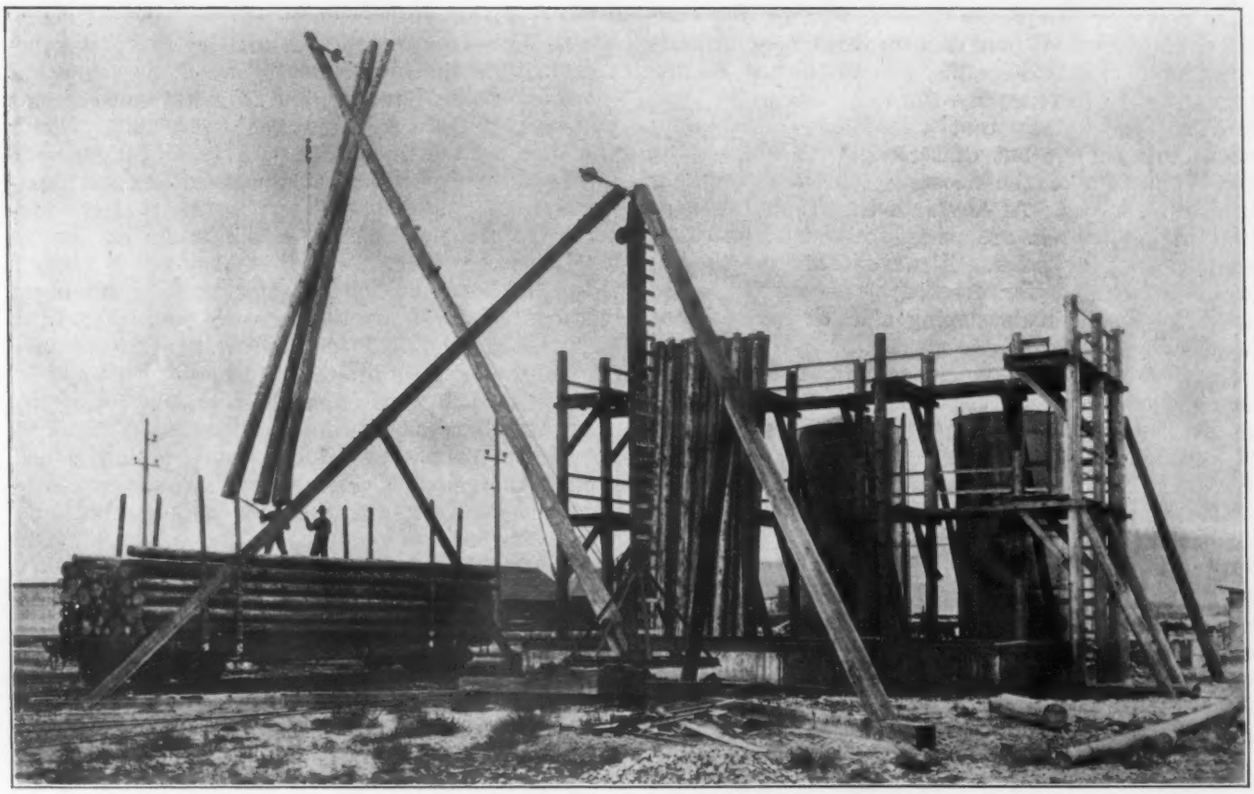
*Extracts from a paper read before the second annual general meeting of the Technical Section of the Northwest Electric Light and Power Association, Spokane.

a vertical cylinder. In this process the poles are placed in the tank and in some cases are steamed in order to drive off excess moisture. After this, hot creosote is supplied at high pressure varying from 40 to 80 lb. per sq. in. on the portion of the poles to be treated. The excess creosote is drawn off from the bottom of the tank and is re-used in the spraying-process. This treatment is continued over a period of from four to eight hours, depending upon the timber and the amount of impregnation desired.

A common treatment among the open-tank methods is the specification "B" treatment in which the poles are placed in upright tanks with the butts fully and continuously submerged in a preservative. The duration of treatment is divided between the hot bath and a cold bath. The poles are left in the hot bath for a minimum of four continuous hours, after which they are subjected to a cold bath in which they remain for a minimum of two hours. Poles that are given this treatment are tested for penetration by the use of the increment borer and when, due to variation in the density of the sapwood, it is found that the penetration is not sufficient the duration of the treatment is extended. The preservative used is creosote conforming to a standard specification. The temperature of the preservative for the hot bath should be about 212 deg. F., and may vary between 180 deg. to 230 deg. F. For the cold bath it should not exceed 112 deg. F. at the conclusion of the treatment.

The short-time treatments, such as the "A" and "AA", may not give a sufficient penetration of oil even when poles are seasoned properly, while the "B" treatment is usually satisfactory when applied to seasoned poles. However, it is found frequently that many seasoned poles are resistive to treatment and cannot be penetrated sufficiently even by the "B" treatment. Some cedar poles have a hard shell immediately under the bark not always uniform in extent with the result that there is no uniformity in the penetration and one section will be found more deeply impregnated than another. This, of course, is unsatisfactory because the benefits of treating are proportional to the depth of penetration. To overcome this condition the process of puncturing or perforating pole butts has been devised.

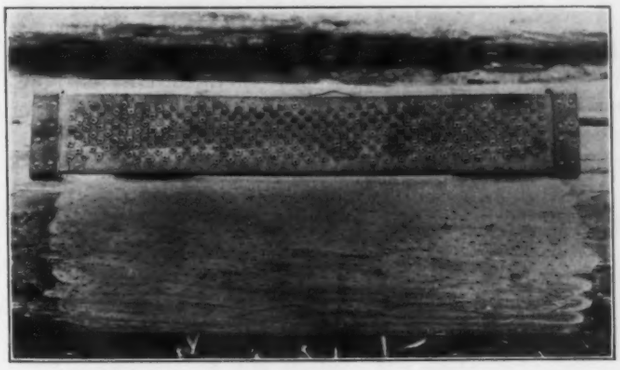
The perforations are made in that portion of the pole's surface extending from one foot above to two feet below the ground line, making a total distance of three feet. There is still some question as to the depth and the circumferential and longitudinal spacing of the punctures. Since the sapwood of Western red cedar runs about ½ in. thick, a penetration of ½ in. seems proper for that species. The width of spacing will vary with different kinds of wood, but for cedar the detail of perforation spacing as shown in Fig. 410, p. 787, N.E.L.A. Proc. 1921, is followed closely with only slight modifications in certain instances. It has been found that this perforating process assists in driving the moisture out of partially seasoned poles and in producing a practically perfect absorption of creosote with a penetration of somewhat greater depth than the depth of the perforations.



Open-tank pole-treating plant.

The first experiments in perforating poles naturally were made by hand. The device first used was a belt consisting of several thicknesses of heavy canvas into which wedge-shaped points ½ in. long were fixed securely. This belt is placed along the pole and the flat side hammered so that the points are driven into the wood. The hammer method, which followed the belt method, consists in striking the pole with a broad-faced hammer in which spikes are set, and for a time this was considered an improvement in the process of perforating a pole. But as the demand for treated poles became more pronounced, methods were sought whereby the process of perforating could be speeded up. The result was a machine, of which several different types have been developed and are producing successful results. The two main types in use are the older "gravity drop" type and the more recent "spring level" type.

In the gravity-drop machine the puncturing is done by 42 iron bars 4½ ft. long, 3 in. wide, and ¾ in. thick, weighing approximately 37 lb. each. At the bottom end of the bar is a detachable point holder so that the depth and spacing of the puncture can be regulated. Each bar works independently of all the others, and this takes care of the irregularities of the pole. The bars are raised by cams and dropped by gravity. The pole is brought under the bars on live rolls and then raised into position by a pneumatic hoist, this hoist providing at the same time an air cushion which takes up the shock when the pole is punctured. To avoid injuring the sapwood on the underside of the pole when the bars drop, two oscillating wheels, 24 in. in diameter and 18 in. wide, provide a sufficient bearing surface. The wheels are so constructed that no matter what position the pole is in or what taper it may have it will have a full 18-in. bearing surface.

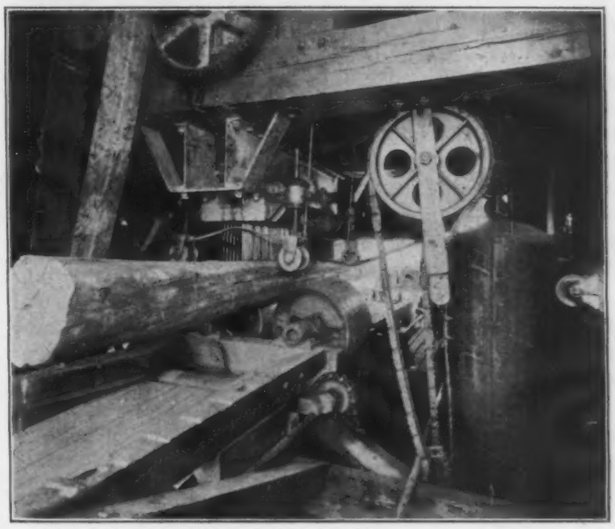


Belt for perforating pole butts before treating.

Application of Methods

Experience has shown that the life of poles treated by the brush or other superficial methods is increased only slightly, and in most instances, not sufficiently to warrant the expense of such treatment. Such methods of treating are still used but when applied it should be only with due consideration to the character and permanency of the line into which the poles are to be placed.

In general some type of impregnation treatment usually is applied. Various methods as outlined above are used, each giving good results depending on the type of pole to be treated and climatic conditions and type of soil in which it is expected to give service. The durable species such as chestnut and Western red cedar do not as a rule require a treatment throughout the entire length, but other species such as the Southern yellow pine, Western yellow pine and Douglas fir which are not durable above the ground line require such treatment, with the result that the pressure treatment is used. The localized pressure method, which only recently has been tried, may be conductive of good results in the case of cedar poles.



Gravity-drop machine for perforating pole butts.

The open-tank method Specification "B" is the treatment most commonly used on the cedar poles. It, in combination with the perforation of the pole butt, seems offer today the real solution to the efficient preservation of cedar poles. Although the method has not been in use sufficiently long to get any definite data as to the expected life by depth of penetration and uniform absorption such as made possible by the puncturing processes, the indications are that it should be possible to secure from 40 to 50 years of life out of a cedar pole thus treated.

Experience has shown that the benefits secured from preservative treatment depends entirely upon the depth of impregnation and upon the quantity of creosote that is injected into the pole. At the convention of the American Wood Preservers' Association held in New Orleans during January, 1923, a report was made by a committee which had been conducting an extensive study of the perforation treatment of poles. In reporting on the relative absorption of oil by perforated and non-perforated pole the committee found that the perforation treatment increased the consumption of oil by 58 per cent and that all additional oil was concentrated in the three-foot, perforated, ground-line section of the poles.

By the perforating of poles as described above green poles can be treated as thoroughly as seas-

oned poles, the principal difference being that it takes some days after treatment for the oil to travel through the fibers of a green pole.

Economies of Pole Treatment

When several methods of construction, differing in cost and expectation of life may be used, one of the most important questions to be decided in making a selection is, "Which method will be the best in the long run?" Sometimes a decision can be based entirely on cost and sometimes other factors may be present which will overbalance the cost, as in the case of pole treatment the primary factor is cost, but continuity of service is another factor that must be considered. The cost of treating poles varies considerably with the method of treatment, size of pole and cost of labor and material at time of treatment. In order to obtain data which would be applicable at any time the following calculations all have been made on the basis of the per cent additional cost of a treated pole over the cost of an untreated pole when set in place.

The common basis for comparing treated and untreated poles is on the annual cost of service, which includes interest on the investment, depreciation, maintenance and operation. The cost for operation

Spring lever machine for perforating poles.

is the same whether the pole is treated or untreated. The maintenance cost of a pole is the labor cost of resetting it, over and above the labor cost of setting the original pole. It is assumed that the pole is replaced without having been stubbed or otherwise repaired during its life. This cost must be spread over the life of the pole in order to obtain the annual maintenance cost. The interest cost depends directly on the rate of interest and the cost of the pole in place. The annual payment into a depreciation fund depends entirely on the type of fund.

In making the calculations for the curves, of which the accompanying are samples, the following assumptions were made: that the rate of interest is 8 per cent; that the depreciation is computed on a sinking-fund basis with interest at 4 per cent compounded annually; that the life of an untreated pole is of varying duration of 5, 10, 15 and 20 years; and that the labor cost of resetting the pole, over and above the cost of setting the original pole, is a variable equal to 0.0 per cent, 100 per cent, 200 per cent and 300 per cent of the cost of an untreated pole set in place.

The total annual service cost for a treated pole must not exceed that for an untreated pole; otherwise the treatment of the pole does not pay in the long run. For an untreated pole the total annual service charge on the assumptions stated above is 8 per cent interest plus 8.33 per cent depreciation for 10-year life, or a total of 16.33 per cent of the first cost of the untreated pole in place. For a treated pole the total annual service charge must not exceed the same amount, but the annual interest is 8 per cent of (100+X) where X is the maximum per cent of the cost of the untreated pole in place that may be paid for treatment. Therefore the amount which may be added to the replacement reserve per year for the treated pole is .1633—.08 (1+X), expressing all percentages in decimal fractions.

The sinking fund formula is $p=\frac{rs}{(1+r)^N-1}$ where p is the amount to be set aside annually at r per cent interest compounded annually to accumulate s dollars in ^{N} years. Therefore letting $p = .1633—.08\ (1+X)$, $r=.04$ and $s=1+X$ we get $.1633 —.08\ (1+X)=\frac{.04\ (1+X)}{(1.04)^N-1}$. We may assume various values for ^{N}, the total life of the treated pole, from, say 15 years to 35 years, and solve for X, giving the points on a curve which will show the maximum amount in per cent of the cost of an untreated pole set in place that may be paid for treatment of the pole without exceeding the total annual service cost of an untreated pole.

All the above is based on the assumption that the labor cost of resetting the pole is the same as the labor cost of setting the pole in the first instance. This is not the case except where a line is being rebuilt over a new route or some similar condition. Usually the labor cost of resetting a pole is considerably more than the cost of the first setting, due to the taking down from the old pole and placing on the new pole of crossarms, braces, guys, transformers or other fixtures, and also to the fact that it takes more man-hours for a gang of men to reset one pole probably several miles from the pole yard than it took to set the same pole when a construction gang was building the line.

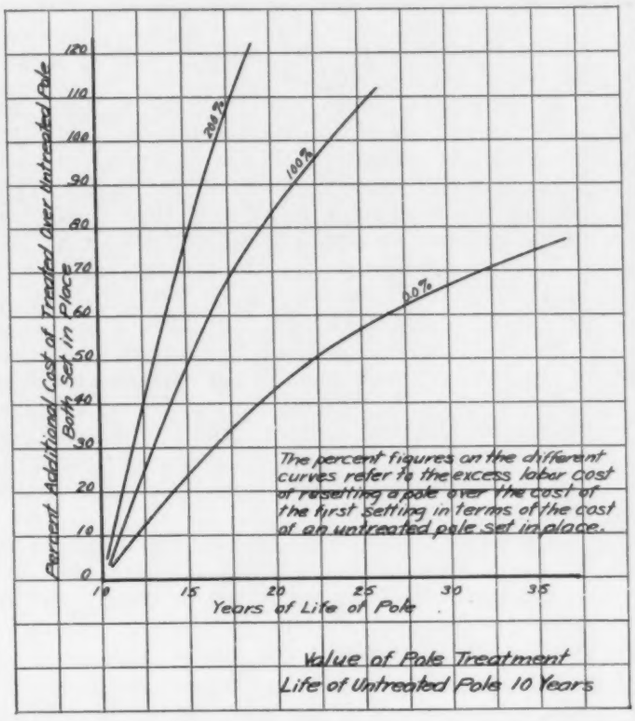
Since the treated pole will have to be replaced less often than the untreated pole there will be an annual saving in maintenance, if treated poles are used, equal to the excess cost of resetting a pole divided by the number of years in a period of time during which it is necessary to replace one treated pole less than untreated pole, that is, if the untreated pole has a life of 10 years and the treated pole a life of 20 years and the excess cost of resetting over the original setting is $20, the annual saving is $20 divided by 20 years or $1.00. For, in twenty years it will be necessary to reset two un-

treated poles at a total excess cost of $40 but only one treated pole would be reset at an excess cost of $20. This may be expressed mathematically.

$$\text{The annual saving} = \frac{N \times 10}{N - 10}^{Y}$$

where 10 is the assumed number of years of life of an untreated pole, N is the number of years of life of the treated pole, and Y is the excess cost of resetting a pole over the cost of setting the first pole.

Taking into consideration this saving in resetting cost the equation may be written for the value of p in the sinking fund formula as $p = .1633 - .08(1 + X) + \frac{N \times 10}{N - 10}^{Y}$. Using this value for p and holding Y constant first at 100 per cent, then 200 per cent, and finally 300 per cent, three curves showing the maximum per cent increase in cost of the pole in place that may be paid for a treated pole over an untreated pole were plotted. Then assuming a life of an untreated pole to be 5, 15 and 20 years, similar sets of curves were made. It is believed that these sets of curves cover a range in the life of poles and cost of resetting wide enough to include practically all the conditions found in practice.



Curve showing value of pole treatment with estimated life of untreated pole as 10 years.

The set of curves as prepared have four variables, namely, the life of the pole untreated, the life of the pole when treated, the cost of treating the pole, and the excess cost of resetting a pole over the cost of the first setting. In order to use the curves to solve any particular problem three of these variables must be known or assumed. Usually it will be necessary to assume the expected life of an untreated pole, taking into consideration the kind of wood and the location, and also the expected life of the same pole when treated by the method proposed. From past experience it will be possible to estimate approximately the excess labor cost to reset the pole over the labor cost of setting the first pole. From the curves the maximum per cent of the cost of the untreated pole set in place that may be spent for treating the pole may be determined and compared with the actual known cost and a decision made as to whether it will pay in the long run to treat the pole by the method under consideration.

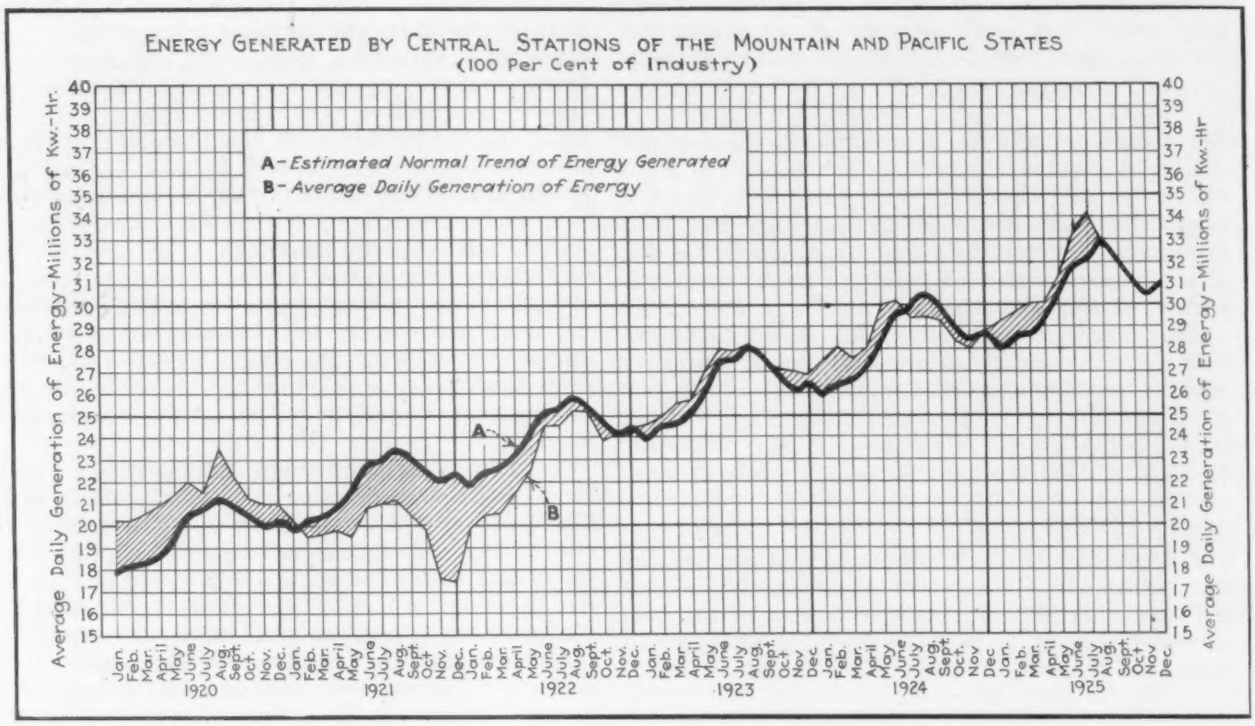
To take a specific example, assume that a line 10 miles long is to be built using 45-ft. cedar poles. The poles cost $10 untreated and $15 treated by one of the perforation methods. It will cost $10 to set and frame the poles. It is expected that under the climatic and soil conditions peculiar to the line that the life of an untreated pole will be 15 years and that by treatment by the method proposed the life will be increased to 25 years. It is estimated also that it will not cost more than $10 for the labor of resetting a pole so that no excess cost of resetting poles can be charged. Under these assumed conditions it is found that the maximum percentage of the cost of the untreated pole in place that can be spent for treatment is 25 per cent of $20, or $5, which is exactly the amount that the treatment costs. Theoretically, therefore, it will make no difference in cost in the long run whether the poles are treated or not.

If, however, it is estimated that it costs $20 for labor to reset a pole in the line to replace one which has rotted away, then the excess labor cost of resetting over the first cost of an untreated pole set in place is 50 per cent and from the curves it is found that a maximum of 38 per cent of $20, or $7.60, may be spent for treating the pole in order to extend its life to 25 years. There is, therefore, no question but that it will pay to spend $5 for treating the pole.

These curves may be used also for comparing the cost in the long run of two different types of poles; for instance, whether it is best to set fir poles with an expected life of five years or cedar poles with an expected life of fifteen years when the cedar poles cost $20 set in place while the fir poles cost only $10.

Central Station Industry in the West Showing Record Growth During 1925

THERE are many indicators of the growth of prosperity of the electric light and power industry, but without question the amount of energy generated indicates in the most accurate way the activities of the industry. In the final analysis it is the amount of energy generated and sold which is the significant factor in its prosperity.



The accompanying diagram gives the history of the activities of the central stations in the Mountain and Pacific States since the World War. An estimated normal trend in the amount of energy generated, based upon the activities of the industry during the past five years, also is indicated. With the exception of the years 1921 and 1922, which cover the period of the national industrial depression, the output of the central stations in the West has shown a steady annual growth. The last of 1924 witnessed activities slightly below the estimated normal for those months, but with this exception and during the industrial depression the industry has operated well above the estimated normal.

The present year is witnessing the largest growth ever recorded by the electric light and power industry in the West. Since the opening of the year the output has been several per cent above the estimated normal, and not until August did a drop take place. In August the industry was operating almost exactly at normal, based upon operations during the past five years, and there is every indication that during September it was operating again above the estimated normal for that month.

In August of this year the electric light and power companies of the West generated 1,014,699,000 kw-hr. of energy, which was 11.7 per cent above the amount of energy generated in August, 1924. During the first eight months of 1925 these companies generated a total of 7,601,997,000 kw-hr., and it is estimated that during the present year a total of 11,370,000,000 kw-hr. will be generated, an increase of 870,000,000 kw-hr. over 1924.

In the country as a whole the August operations of the industry were about 2 per cent above the estimated normal for the month, and the accumulated figures for the first eight months of the year indicated that a total of 59,057,000,000 kw-hr. would be generated during 1925, an increase of 5,227,000,000 kw-hr. over 1924.

It must be remembered that all these figures are for the electric light and power industry only, and do not include energy generated by purely electric railway companies, Reclamation Service plants, or private industrial generating plants.

Tell the People*

By NORWOOD W. BROCKETT
Director of Public Relations, Puget Sound Power & Light Company, Seattle

IT is not necessary in talking to a group of public utility men to emphasize the importance of winning the good will of the communities in which we do business. Until very recently we all have proceeded upon the theory that any industry which gave the best possible service at the least possible cost, which treated its customers fairly, and which entered into the civic life of the community, must in time gain the good will of the citizens of that community. Unfortunately this seems to be true of every line of industry except that of the public utility. We do not experience the same measure of friendly feeling towards our business which practically every other business conducted along legitimate lines enjoys. Nor is the reason for this hard to find. No other industry is subject to the same

*An address before the Pacific Coast Gas Association Convention, Portland, Aug. 17-21, 1925.

constant malicious attack on the part of unscrupulous politicians as is the public utility, and we have in the past made a very serious mistake in permitting these unfounded attacks to remain unchallenged and unanswered.

Then again, the very first contact which we have with our customers is an unfortunate one. A public utility furnishing gas, electric light and power, telephones or transportation is generally the only company furnishing a like service in a given community. The American people are essentially a nation of bargainers. We pride ourselves on our shrewdness in driving a deal, and for practically every commodity which we purchase we are at liberty to "shop around" until we find the article we desire at the price we are willing to pay. The public utility has taken from the people this privilege of bargaining. If we want gas or light service, or a telephone connection, there is generally but one place from which we can obtain it, and there you are asked to pay a certain specified price and to sign a contract in the drawing of which you have not been consulted. Subconsciously the average individual resents this, and immediately he is impressed with the fact that this particular public utility enjoys a monopoly and that he must submit to whatever terms it cares to dictate. This unfriendly attitude on the part of the customer fanned into open indignation by the political demogogue, combined with our neglect to place true facts of our business before the public, in my opinion, has led to most of our troubles.

In getting before the public the truth about the public utilities and the manner in which they conduct their business, I know but two media—the printed and the spoken word.

Of the two I believe the spoken word to be far more effective, and in spite of many assertions to the contrary we can reach practically all of our customers through the spoken word. It can be done only in a limited way by public speaking at commercial clubs, noonday luncheon clubs and similar organizations, but it can be done in a very extensive way through the tremendous number of employees in the public utility business.

It has been my experience that the average employee desires to defend his company and to correct mis-statements concerning it. But when he attempts to do so he generally finds that he has such a limited knowledge of the company's operations that his defense is very weak. Group meetings of all the employees of a public utility should be held, at which each detail of the company's business should be explained fully to them, and copies of the explanation distributed so that they can be taken home and studied. Only one topic should be taken up at each meeting, and it should be explained by that member of the company who is known to the employees to be fully conversant with that particular subject.

The media for the use of the printed word are many; chief of these is the newspaper. The paid advertisement which frankly is published to inform the reader as to some of the problems of the company, or to correct mis-statements made concerning it, are read and, if true, are believed. In addition the newspaper is invariably willing to print any real news item furnished by the utilities. For years we have neglected this source of publicity. We have become so absorbed in the building of plants and the extension of service that we have forgotten to tell the people, through the newspapers, what we are doing to help build up those communities we serve.

What are the things that each of our employees should know, and what are the messages that we wish to take to the people?

Ownership—There still exists in the minds of a great many people the idea that the average public utility is owned by a few wealthy men, residing somewhere on the Atlantic seaboard, who are getting immensely wealthy from the excessive profits taken from the people. Make them realize that the average public utility is owned by thousands of stockholders in every walk of life who have invested their savings to make the service possible, and that whatever profits are made from the service are returned to these thousands of stockholders in the shape of dividends. The fact that most of the companies today are selling their stock to their customers is doing much to remove this erroneous impression of ownership.

Regulation—The operations of the public utilities in the past have been shrouded in mystery. The impression has been created that there is something unusual and underhanded in their manner of conducting business. As a matter of fact, the conduct of the business of a public utility does not not differ from that of any other corporation, except that the utility is regulated. Not one person in a thousand knows that we are regulated, and the one who does know has no conception as to how this regulation is accomplished, or why. Explain to the people that the furnishing of a public service is generally a natural monopoly; that in times past some few companies took advantage of this natural monopoly, either by neglecting to give the people the service to which they are entitled, or by charging an unreasonble rate; that since we all are dealing in a commodity which has become almost a necessity the people through their various legislatures, have created the "regulatory body" to stand between the natural monopoly and the people who desire to use its service. Practically every state in the Union created a commission with full power to regulate both the service given and the rates charged by these public utilities—a body to which any consumer could appeal if he felt himself aggrieved. Explain that we are permitted to charge a rate sufficient to earn only a fair return in the shape of interest and dividends upon the actual value of our properties as determined by the commission's own engineers; that the rate is based entirely upon the appraisal of such engineers; that the commission is not concerned as to the outstanding stocks and bonds of the company; and that any statement that, under regulation, a public utility is permitted to earn a return upon so-called watered stocks is absolutely untrue.

Rates—I am not as familiar with gas rates as with those for light and power, but I do know that while the average cost of living in the United States has increased 65 per cent since 1914, the cost of electric energy steadily has decreased. I know that the average residence bill for electric service, including all the numerous socket appliances, such as percolators, vacuum cleaners, flat irons, and so on, is less than $25 a year—less than $2 a month—less than the cost of ten gallons of gasoline. We are constantly explaining to the people of our district the reason for reduced electric rates, since the municipal plants in those districts where we have municipal competition are prone to take all the credit, entirely overlooking the fact that the same reduction in rates has been practically uniform throughout the entire United States.

Service at Cost—There has grown up in this country a belief that gas, electric energy, telephones and transportation should be furnished the people at cost. The people are being told that for public necessities of this character they should receive "service at cost," and that this can be obtained only through state, municipal or government ownership. The strange part of the agitation seems to be the lack of knowledge on the part of the people that today they are receiving this "service at cost." Under state regulation that is all that a public utility is permitted to charge for its service—the cost of furnishing the service, plus the cost of the money invested to make that service possible.

As I explained before, the average public utility is not considered as a part of the business life of a community, but as something alien and foreign which has fastened its tentacles onto the community, and which the community would gladly throw off if possible. This is the impression which has been created by the demagogue and is probably the most difficult one to remove. Tell the people how much you pay each year in taxes, the number of people in your employ, your annual payroll, the amount you spend each year in improvements and betterments to your system, and how these improvements go upon the tax rolls again to help carry the tax burden. Tell them the amount of money spent by the company each year with the merchants and manufacturers within the district, and ask them frankly why it is that this particular industry which is doing its full share towards building up the community cannot be permitted to operate peacefully and without being the continued object of attack of a certain type of politician.

There is no one spectacular thing which any person can do to improve the public relations of his company. In no company can it possibly be a one-man job. The result can be obtained only after months and years of persistent effort on the part of every member of the organization, first by so conducting the business as to warrant the good will of the people, and second by taking the public fully into your confidence and by permitting no lie or malicious misrepresentation to go unchallenged.

Annual Report of the President of the P.C.E.A.*

WE open today the fourth annual convention of the Pacific Coast Electrical Association. This is our ninth meeting since organizing the Pacific Coast Division of the National Electric Light Association held its first convention at Riverside in 1917. Due to the fact that we are particularly fortunate this year in having the National Convention in San Francisco at this time, our Pacific Coast Convention will be limited to today's meeting. The time will be taken up by the election of officers for the ensuing year and for the reading of reports by section and committee chairmen.

With the National Convention in San Francisco, it will be possible for large numbers of member company employees to attend the most interesting and instructive sessions of the National Sections. It is hoped that this opportunity will be taken advantage of and that a particularly large attendance will be present at our meetings for the remainder of the week.

Present Election Method

The present administration of the Pacific Coast Electrical Association had the advantage of an early start this year due to the change in the method of election which was inaugurated at the beginning of the year. This year the election was held at the beginning of the convention and gave the incoming president an opportunity to confer with the prospective committee appointees during the convention. This opportunity was appreciated and taken advantage of with the result that the committee work this year was organized effectively at an early date.

Executive Committee

Five meetings of the Executive Committee were held during the year. The first was held at Coronado on June 19, 1924. The organization of sectional work was discussed at length. The matter of having a paid secretary for the Association was recommended and discussed.

At the second meeting in San Francisco on Aug. 14, 1924, the combination subscription membership plan, submitted by the Journal of Electricity was discussed and adopted.

The third meeting of the Executive Committee was held in Los Angeles on Nov. 13, 1924, at which time the budget was discussed and approved as submitted.

The fourth meeting was held in San Francisco on Feb. 19, 1925. At this meeting plans for the National Convention to be held in San Francisco, June 15, were discussed in detail.

At the fifth meeting of the Executive Committee in Los Angeles on May 14, 1925, the functions of the California Electrical Bureau were discussed. The importance of studying electric transportation, by one of the Association's committees, was brought up and after a thorough discussion the matter was referred to the chairman of the Commercial Section.

Proceedings

At the beginning of this year's activities, arrangements were made with the Journal of Electricity whereby all members of the Pacific Coast Electrical Association received as a part of their membership a yearly subscription to the Journal. The Journal in turn has published all the material submitted to it by the Association which would be of interest to the members of the Association. This includes the publication of the

* Due to the limited amount of time available for the annual meeting of the Pacific Coast Electrical Association, the reading of the President's Report was omitted from the program on June 15, 1925.

papers of the various sections prior to their being read at the Convention. The arrangement with the Journal of Electricity has been particularly satisfactory and we feel that it has been very helpful to our members to have had a personal copy of the Journal at their disposal. In addition to this the proceedings in bound form will be printed as heretofore.

Work of the Committees

The committee work has been particularly satisfactory during the past year. We believe that too much emphasis cannot be laid on the advantage which accrues through the present election method which makes it possible for the plans for the coming year to be formulated during the convention period. It is hard to estimate the time gained and efforts saved by this procedure. The Courteous Service Club Committee (organizer of the Smiles Club) of the Public Relations Section has followed up to advantage the very effective work which it inaugurated last year. We feel that this movement merits the support of our Association because it is a distinctive undertaking which endeavors to mold the attitude of our industry for better public relations. The papers of the Technical Section continue to maintain the high standard which has heretofore been set by this section. Substantial contributions have been made toward the solution of problems encountered in the interconnection of large power systems.

The activities of the Commercial Section have been particularly noteworthy. The work of the Transportation Committee deserves the earnest consideration of all of us. The innovation of the Lighting Committee in holding the Lighting, Electric Truck and Industrial Heating Schools is an outstanding accomplishment. The Lighting School enrolled a total of 103 in the schools in Los Angeles and Oakland. These schools finished with a remarkable attendance record of 96 per cent.

The Association has supported and cooperated with the National Committee on the Relation of Electricity to Agriculture. This committee now has passed from a formative stage to the active investigation and research into the present and potential uses of electricity in agriculture. In this investigation of the potential possibilities of the utilization of electricity on the farm, we should set as our goal the attainment of greater economic stability in the agricultural industry. We urge the continued support of this committee's work by the Pacific Coast Electrical Association.

This year the valuable and constructive work of the Publicity Committee was rewarded by being created a section, thus giving the deserved and merited recognition which it has earned.

We feel that the committee work of the Association is probably its most important function and that in order that the membership receive the maximum benefits, that the personnel of the committees should be changed so that best results will be obtained not only by the members but also by the Association itself. It is felt, however, that practice of carefully choosing a vice-chairman with the thought in mind that this vice-chairman will succeed to the chairmanship the following year, is a practice which should be continued. In this way our committee work will be given proper continuity from year to year and we will have a chairman qualified by experience and training to keep up the high quality of leadership which has been displayed by the chairmen during the preceding years.

National Association

This year the presidency of the National Electric Light Association went to a Western member. This resulted in increased cooperation between the officers of the national body and the Pacific Coast Electrical Association. The local committees have been made to conform with the line-up of the national committees and in this way better understanding has been promoted between the two committee groups. It has made it possible for them to work along the same lines of endeavor to a common purpose. This happy understanding between the national body and our Association has culminated in the National Convention being held in San Francisco. This, indeed, will be an inspiration to our Association, to promote the common cause.

During the year many of our members have attended National committee meetings and we feel that the benefit therefrom has been mutual. Excellent results were obtained at the Commercial National Section meeting which was held in San Rafael, Nov. 19-21, 1924. While we appreciate that most of the member companies are east of the Rocky Mountains, it is certainly encouraging to have an occasional National committee meeting and now a National Convention on our West Coast. These contacts resulting in better acquaintanceship between the East and the West are bound to promote an even better conception and understanding of our mutual problems.

Public Relations

We believe that the public utilities of the West are coming into their own with regard to public relations. During this year the people of California again voted down the so-called Water and Power Act by an overwhelming majority. The problems of the public utilities are becoming better known to the public in general. It means ever continuing the educational work which has been started. The place which we now hold in the public mind can only be maintained in its present staunch position, by being sure that the public continues to have the facts. The accomplishments of the public utilities, particularly in California, during the last year can only be the subject of commendation when all the facts are known.

The year 1924 marked the eighth successive year of subnormal precipitation throughout the whole state. In spite of this unheard of shortage of water, curtailment of power was cut to a minimum and the utilities shouldered the enormous obligation of going through the stress of the abnormal conditions without increasing the rates. When these facts are known, such achievements are bound to be reflected in the esteem of the public.

Never before have public utilities' securities stood as high on the exchange. It is the result of the popularity of these stocks as an investment. The investing public have come to realize the soundness and security of the business in which we are engaged. The opportunities for good public relations rests in our own hands and we feel that through the Pacific Coast Electrical Association, we have the opportunity of pooling our individual experiences for the benefit of all our member companies.

Customer Ownership

We are all convinced that public ownership by means of customer ownership is the basis for our economic and financial success. This step was initiated in the West and has reached its highest state of development in our Western utilities. Customer ownership carries with it, also, its definite responsibilities. It makes private management definitely responsible for its acts, a thing which does not exist in the case of political ownership. The happy combination of public ownership through customer ownership, with private management held to its responsibilities coupled with proper government management has been worked out to a most successful conclusion in the West.

Interconnection

In the West we have long taken advantage of the possibilities of interconnecting the systems of our various companies when it is to the mutual advantage of all concerned. The remarkable accomplishments of last year were made possible by the system of interconnection which has been in vogue with us for many years past. We have possibly said too little about this thing in the past, which now in some quarters is being heralded as a panacea for all the ills of power transmission. Good business and fundamental economic reasoning long ago brought us to the continued use of interconnection.

Employees

Two years ago the Pacific Coast Electrical Association inaugurated a Personnel Committee. Last year this was followed by the National Electric Light Association starting an Industrial Relations Committee. Many of our larger companies are realizing the importance of the human side of our industry and it is with a view of bringing this most important matter to the attention of us all that the Committee of Personnel was originally instituted. Our whole public relations program is so tied up with the maintaining of a properly trained staff of employees that the two are inseparable. We recommend to this committee a most careful consideration of the matter of employee training in our industry.

Secretary

The services of our secretary, Samuel H. Taylor, have been invaluable to the whole electrical industry. We are particularly gratified that it has been seen fit to put this office on a remunerative basis and in this way show the appreciation which the Association owes to the effective and efficient work of Mr. Taylor. It has been his work which from year to year has ironed out the rough spots in our Association's work and brought to it a continuity of effort. The success of our Association this year, which I feel has been signal, is due to the excellent cooperation between the officers, sectional chairmen, committee chairmen and committee members. In closing my report I desire to extend my heartiest congratulations to you for the success of this year and my deep appreciation for your untiring support.

FRANK A. LEACH, JR., President

Report of the Secretary of the P. C. E. A.

IN formulating this, my fifth yearly report of the activities of the Pacific Coast Electrical Association, I do so as the sole continuing official for such period of time.

The belief is strong within me that very few of the executives of our Class A members have a definite understanding or knowledge of the organization which this association has developed during the past five yearly administrations and the story should be told at this time in the secretary's report.

Our committee set-up, which includes the following sections and committees,

Public Policy Section	Accounting Section
Public Relations Section	Purchasing and Stores Section
Publicity Section	Personnel Committee
Technical Section	Insurance Committee
Commercial Section	

numbers in personnel 650 members, participating in the activities of their respective sections during the year; in addition should be added the elected and appointed officals of the organization, numbering eighteen members.

The above-mentioned sections are made up of committees covering every branch of the electrical industry, and membership on these committees is sought by individuals at this time rather than solicited by the respective chairmen of such committees, as was necessary in years past, to complete their respective personnels.

Our membership list totals approximately 2,600 of all classes, from which it will appear that 25 per cent of the individual members are participating actively in the various committee functions carried on by the association.

The work accomplished, and which could be expanded largely by this splendid organization, is handicapped by the limited financial resources at its command. These resources are secured solely through appropriation by the national executive committee, the largest amount received from such source being $18,500 per year for the past two years. But one salary has been paid out of such funds, until July 1, 1924, when the secretary's position was placed on a small financial basis.

It would be difficult for one in my position to differentiate in the importance and conduct of the work performed by the various sections under their respective chairmen during the past year.

The several committees of the Technical Section have performed much work of great importance to the industry, and all of which has a direct bearing on reduction in investment and operating costs, as follows:

Meter

Education of metermen will tend to increased efficiency.

Relay calibration will result in improved reliability.

Study of low first cost methods of high tension metering.

Study of meters to prevent loss of revenue through over-metering.

Apparatus

Study of oil circuit breakers already installed for purpose of increasing their rupturing capacity.

Study of oil in effort to select one that will serve for all oil-immersed apparatus.

Study of relays and relay applications to prevent loss of revenue due to unnecessary interruptions and damage to equipment.

Fire-fighting equipment for protection of electrical apparatus.

Hydraulic Power

Hydroelectric plant layout gives industry benefit of best practice in selection and arrangement of plant equipment.

Analysis of plant outage due to hydraulic troubles.

This committee for two years past also has formulated and written the report of the hydraulic power committee of the national association.

Prime Movers

Studies of fuel oil burning and condenser troubles will affect improved steam plant economics.

Underground Systems

Study of duct line temperature and high voltage cable both of which will permit more efficient use of underground cables and will ultimately lead to higher voltage and greater capacities.

Overhead Systems

Revision of General Order No. 64.

If accepted by the California Railroad Commission, will mean saving through reduction in pole height and simplification of construction.

Studies by pole committee will lead to economy in steel poles through standardization and savings in wood poles through data on strengths and treatments.

Transformer standardization will mean lower erection costs and reduced stocks.

Testing insulators in service and hot line maintenance will mean reduced operating costs.

Accident Prevention

This committee has functioned actively during the year, and in its report has outlined the subjects for the coming year, as well.

1925—First Aid Training; Code of Safety Rules and Safe Practices; Company Organizations for Accident Prevention; Accident Prevention Course for Linemen; Safe Practices; Safe Tools and Devices; Safety Bulletins.

1926—Accident Statistics; Best Form of Safety Code; Best Form of Organization; Accident Prevention Courses; Interchange of Important Safe Practices; Safe Tools and Devices; Distribution of Safety Bulletins.

The California Institute of Technology appealed for financial assistance through the Technical Section to enable them to carry on experimental work to determine evaporation losses in reservoirs, with the understanding that the results of such tests would be published in the Pacific Coast Electrical Association's yearly book of proceedings. After careful investigation by representatives of the section, an appropriation of $400 was authorized by the executive committee to aid in this work.

The Commercial Section has held five section meetings during the year, the San Rafael meeting in November having been of the national section, the Pacific Coast section acting as hosts.

The Appliance Bureau has submitted two reports, as follows:

1. Dealer's Plan for Selling Small Appliances.
2. A Merchandising Plan for Central Stations.

The second report has been discussed in much detail, but owing to the diversity of opinion as to the central station engaging in such undertaking, no definite recommendation has been made, the committee merely outlining plans which may be employed should a central station decide to enter the merchandising field.

The Customer Relations Bureau has performed a most constructive piece of work in the preparation of a manual to be studied by employees in the electrical

industry, containing valuable suggestions as to the employees' conduct in dealings with the patrons of Class A member companies, and which, if read and acted upon with intelligence, inevitably will result in improved public relations. Copies of this manual have been mailed, personally addressed, to our executives, and if they have not digested the same up to date, we suggest that they do so at this time, for the opinion has been expressed repeatedly that this committee has produced something of real value to the industry as a whole, and practical use should be made of it through publication and distribution to the employees of our member companies.

The Lighting Bureau has carried forward three activities: first, a tie-in with the Division of Agricultural Engineering, University of California Davis Farm through farm bureaus, and similar meetings throughout the state; second, a follow-up of the national Home Lighting Contest, capitalizing upon the publicity gained through such contact, and bringing about a more widespread knowledge of what good lighting means, as well as affording an opportunity for dealers and others interested to promote merchandising of lighting appliances. The personnel of the California Electrical Bureau has been utilized considerably in this specific activity.

Interest also has been stimulated in the employees' Home Lighting Contest. The Lighting Bureau has given a $50 prize to the winner, and a $25 consolation or runner-up prize, in addition to the company and national association awards.

The lighting schools conducted in Los Angeles and San Francisco have been an outstanding accomplishment of the Commercial Section the past year. The basis of these schools was the national association's lighting sales course, part 2, and designed primarily to give up-to-date, practical information and data on lighting to those who come in actual contact with lighting installations, namely: the electrical contractor or his estimator, together with that branch of the industry which contacts the contractor, namely, the jobber-salesman.

The limit of participants in the schools was placed at 50, divided as follows:

Electrical contractors	25
Jobber-salesmen	10
Architects and engineers	10
Central station men	5
	50

The actual enrollment at Los Angeles and Oakland was as follows:

Electrical contractors	38
Jobber-salesmen	30
Architects and engineers	5
Central station men	20
Fixture manufacturers	6
Miscellaneous	4
Total	103

The attendance at the ten sessions, alternating afternoon and evening, for a two-weeks' period, averaged 96 per cent.

The actual cost of this activity slightly exceeded the original appropriation of $500 made to cover by the previous administration of the section. Many letters of a commendatory nature have been received from the participants in this school work. I quote from one only, written by a member of a well-known architectural and engineering firm:

> I have just completed the course on illumination given by the Pacific Coast Electrical Association. It has been enjoyable to attend the classes and what I have learned will, I know, prove of real value in my work of writing specifications. I hope that your organization, or others of a similar nature, will soon find it possible to give other courses of the same general nature—one on electric heating or domestic uses of electricity—would be of particular value.

Provision should be made within this organization to carry forward such work, as well as similar activities, which constantly are being developed by our committees.

The work of the Transportation Bureau has been devoted largely to the development of the use of electric trucks, and a most successful electric vehicle school was held in San Francisco during June, 1925.

The Power Bureau has submitted comprehensive reports on "Electrification of the Dairy Industry," "Industrial Heating," "Competitive Power in Industry," and "Sale of Power to Hotels."

The Electric Cooking and Heating Bureau's activities include metered water heating in California and electric air heating.

The recommendation also is made that the instruments now being employed by the Northwest association in the study of range load be secured by this association next year, enabling this committee to make a detailed and careful analysis of the value of an electric range and water heater load.

The activities of the Public Relations Section have been confined largely to the Courteous Service Club, otherwise known as the "Smiles Campaign." This work has attracted considerable attention beyond the jurisdiction of this association, and the recommendation is made by the committee having it in charge that the national association make of it a national activity. It it be decided to continue as a division activity during the coming year, it should be under the charge of the industrial relations committee of the Public Relations Section and contact directly with the national association through the chairman of such committee, who becomes a member of the national executive committee of the corresponding national committee.

The remaining section and committee activities have been carried forward in the same thorough manner which characterizes those we have specifically mentioned heretofore. Their work, however, is directly applicable to our Class A members' operations rather than for public use and will be brought directly to their attention through the committee personnels.

In the foregoing I have endeavored to give a clear insight of the educational and promotional activities of the Pacific Coast Electrical Association during the past year, which is true of the organization from year to year, except that interest in the work by those engaged in it through membership on the committees has increased each succeeding year until the past year when, as previously stated, 650 members were engaged actively in the work.

Under such conditions, why the necessity for the further maintenance of another organization endeavoring to work along similar lines and receiving 60 per cent of its financial support from our Class A members, while this organization of **real accomplishment** is retarded in its work and development through lack of necessary funds with which to carry on?

Section 2, Article 2, of the constitution of the Pacific Coast Electrical Association reads as follows:

"It shall be entirely self-governing and autonomous, although affiliated with the National Electric Light Association."

The authors of this document no doubt foresaw the necessity for an organization of broader scope in its activities than is provided for simply as a geographic division of the national association, and, from the wrter's present viewpoint, the time for such broadening of our activities is now upon us.

As chairman of the membership committee it is my pleasure to advise of a very considerable increase in new individual members, Class B.

Contributing reasons for this increase are to be found in the forty-eighth convention of the National Electric Light Association held in San Francisco, as well as the inclusion of a yearly subscription to the Journal of Electricity to all of our members, in addition to the Bulletin.

We regret to advise that our membership lists contain too few Class D and F members, considering the fertility of the field covered by this association in respect to such members, Class D embracing companies or firms engaged in the manufacture of electrical apparatus or equipment for the production or use of electrical energy, and Class F covering companies or firms of electrical jobbers, contractors, dealers, electrical or mechanical engineers, etc., who are interested in advancing the use of electrical energy.

Recognizing the desirability of organizations for specific branches of the industry, we maintain that allegiance is due also to the greater one, embracing as it does, all branches of the industry and deriving its principal support from the central station organizations, the foundation of the industry.

SAMUEL H. TAYLOR, Secretary

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

Fourth Unit Added to Two Original Big Creek Plants

Interesting Construction Features Involved in the Addition of Generating Units at Two Pioneer Plants

By R. C. BOOTH, Assistant to Resident Engineer, Southern California Edison Company, Big Creek, Calif.

On the Big Creek project of the Southern California Edison Company the original installation made about twelve years ago included three dams for the storage of water in Huntington Lake reservoir and power houses Nos. 1 and 2. Plant No. 1 is supplied through about two miles of pressure tunnel and flow pipe from Huntington Lake and 4,000 ft. of penstock, creating 2.130 ft. static head. The water from the tailrace of power house No. 1, with the addition of a few Big Creek tributaries having an early runoff, is carried through 4.5 miles of pressure tunnel, 12 ft. in diameter, and nearly a mile of penstock to power house No. 2 which operates under a static head of 1,860 ft.

In each of the nearly identical buildings were installed two 16,000-kw. generators driven by double-overhung impulse wheels. Room was provided originally for a third machine which later had been added.

During the latter part of 1924 and the first three months of 1925 a temporary end in each building was removed and an extension made bringing the buildings to their ultimate size, a four-unit installation. The fourth unit at No. 2 has been in operation since April 1 and the new machine for No. 1, which is 50 per cent larger, was completed about three months later.

Practically all work on the extension of power house No. 2, except the building of the camp and excavating for the foundation, was done during the past winter under alternate freezing, thawing, and stormy conditions. Water for mixing concrete was heated in an old donkey boiler. In the coldest weather before pouring concrete the forms were washed out with hot water and thin slabs and walls were kept warm for a few days with warm water or "salamanders" under canvas.

A very good grade of concrete aggregate was obtained from the dump at the adit of tunnel No. 8 which carried to a lower plant the water from the tailrace of power house No. 2. The muck was crushed and screened at the dump and hauled about a mile in a 4-yd. auto dump truck to the mixing plant bunkers, which had a storage capacity of 100 cu.yd. Concrete was mixed in a ¾-yd. mixer elevated in a wooden tower and placed with buggies.

The installation of the hydraulic and electric equipment required seven weeks, since which there has been no necessity for a shut-down. After the bearings had been set the shaft was lifted into a vertical position by the crane from a horizontal position on the floor, dropped into place, and centered through the rotor which had been set down in the transformer pit and timbered up level with the machine floor. The rotor had been heated to give proper shaft clearance in about five hours time by means of a coil of heavy aluminum cable wound circumferentially, insulated with asbestos, and energized at 480 volts. As soon as the rotor had cooled and shrunk tightly onto the shaft the unit was cribbed up on the generator floor and the impulse wheels pressed on with a large hydraulic press.

Concrete materials for the construction of the penstock were obtained from a dump at the outlet of Shaver tunnel. This dump is on the hillside about 500 ft. vertically and ¼ mile horizontally above the head of the penstock. A crushing and screening plant at the foot of this dump was supplied by a dragline scraper. Aggregate was lowered by hoist and cable along the slope in a 4-yd., 3-ft. gage car to a depression in which a tunnel trip of 500 cu. yd. capacity had been built. From here the material was drawn in a steel-bottom, batch dump car on a 3 per cent ascending grade to the mixer hopper, the empty car returning to the storage by gravity when the hoist brake was released. One man rode the car, loading through the radial gates in the trap and charging the mixer at the other end of the trip. A double-drum hoist handling the batch car also operated an elevator for hoisting cement to the charging platform. The hoist operator also fired a boiler from which hot water was piped through a storage pile to the mixer. Three men each were required to operate the crushing and the mixing plant.

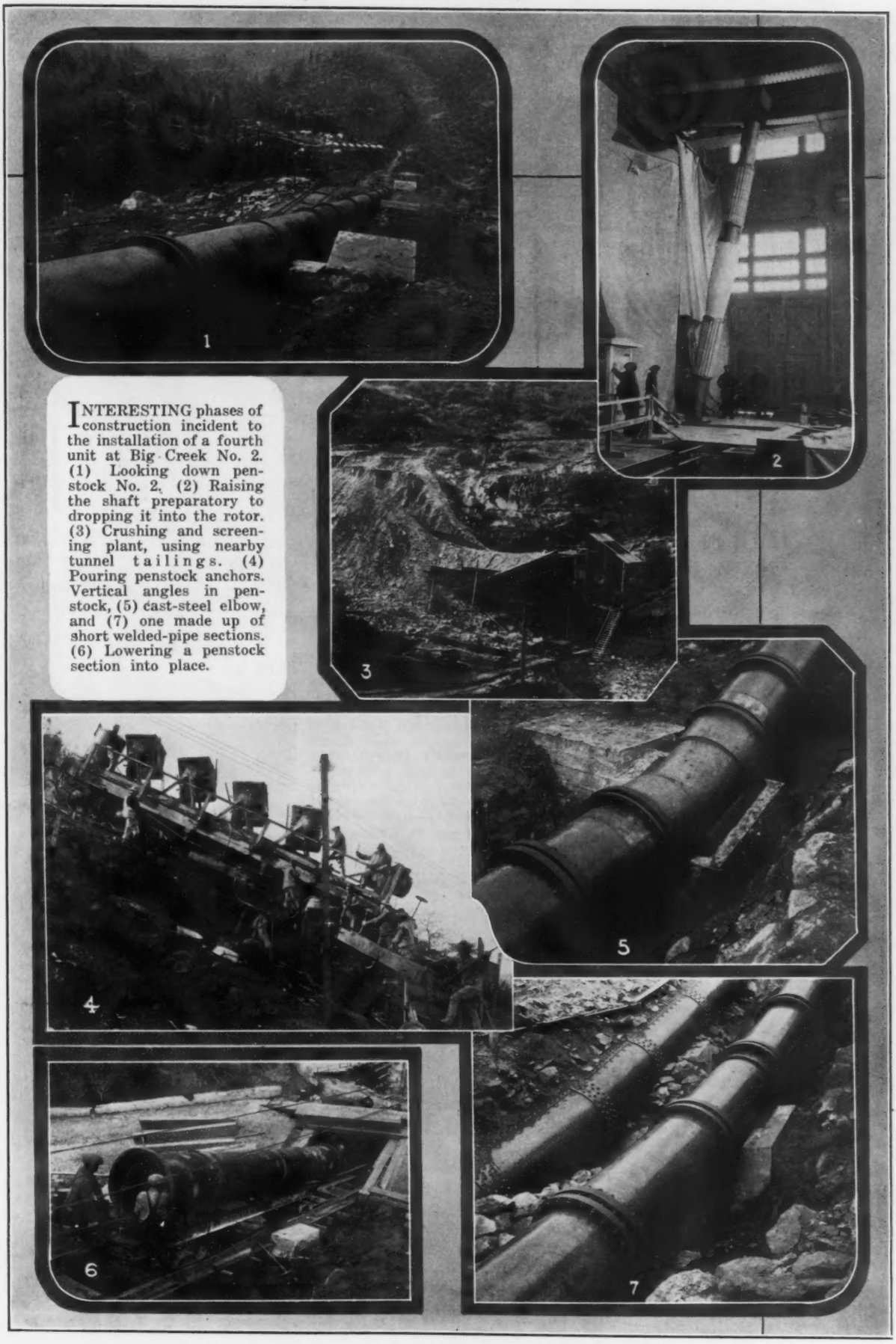
Concrete was mixed in this central plant and delivered to penstock anchors and piers over the main, standard-gage incline on a strong-back flat car with four 1-yd. bottom-dump, steel-car bodies mounted on trunnions so that they rode level irrespective of grade. A small water tank also was provided on the up-hill end of car. By mixing concrete very dry and tempering it in the chute while placing, separation of materials was avoided and the mixture could be hauled any distance without difficulty in getting it out of cars.

With the exception of some of the bends the penstock was of lap-welded pipe with Van Stone flange joints having grooves in one face for round rubber gaskets. The pipe tapers from a 42-in. diameter to a 36-in. diameter and splits into two 24-in. lines just outside the power house. Most of the bends are cast steel elbows 8 ft. long with an expansion joint in each end. Runs of pipe are anchored approximately midway between bends. A cast iron saddle bolted into the concrete anchor, which is entirely below the pipe, holds a heavy U-bolt around the pipe. The pipe has a riveted shear plate butting against the uphill edge of the iron saddle and carrying the longitudinal component of the weight of the pipe. A few slight vertical bends are made up of the regular welded sections of pipe with a solid "dutchman" at the lower end and a split or adjustable "dutchman" at the upper end. This construction is very handy for angles of no more than 5 deg., beyond which it is advisable to use elbows. A maximum of about 2 deg. may be obtained per joint with "dutchmen."

The pipe sections, nominal length 30 ft., were delivered two to a load on strong-back cars to several unloading stations along the main tramway where they were transferred by a gin pole to a steel sled which slid along on wooden skidways straddling the concrete saddles. Pipe and sled, both of which were held by a cable bridle, were lowered into place by an electric hoist. Saddles were poured 1 in. below grade and grout-filled after the pipe was placed. Two layers of graphite packing were inserted.

The skidway was built in a temporary manner of small-dimension salvaged timber and was taken up as the pipe was laid. Three portions of the penstock were on a rather light grade, and pipe was rolled directly from the main incline car into the saddles. After part of the bends had been set and the connection made at the power house the bulk of the pipe was placed in two weeks, indicating that this type of pipe and method of placing are quite satisfactory. The flange joints are somewhat more expensive but have a number of very decided construction advantages over the bump-joint type. Riveting, calking, fitting, and the necessity of working inside the pipe all are eliminated through the use of flange joints. Experience seems to indicate that these advantages more than offset the added weight and cost of steel pipe.

London has sixty light and power plants competing for the electrical business of the world's largest city. Chicago, with one company, generates and sells twice as many kw-hr. as London's sixty companies. Chicago's per capita consumption is six times that of London. And it costs Chicagoans only a trifle over half as much for their electric power as is the London charge."—Delta Star.



INTERESTING phases of construction incident to the installation of a fourth unit at Big Creek No. 2. (1) Looking down penstock No. 2, (2) Raising the shaft preparatory to dropping it into the rotor. (3) Crushing and screening plant, using nearby tunnel tailings. (4) Pouring penstock anchors. Vertical angles in penstock, (5) cast-steel elbow, and (7) one made up of short welded-pipe sections. (6) Lowering a penstock section into place.

Power Company Communication Systems — I (b)

Standardized High-Line Telephone Protective Equipment Applied to Cables and Indoor Switchboards

By H. N. KALB*, Telephone Engineer, San Joaquin Light & Power Corporation, Fresno, Calif.

Where telephone relays or similar apparatus are to be connected direct to the line on the station side of telephone insulating transformers a further protection is needed between wires. Use is made here of a special protection block having the appearance of carborundum. This block gives a very high resistance short between wires at normal voltage, but at higher voltages the current is sufficient to blow the fuses. This does away with the usual trouble of having relay or other coils punctured at the terminals during a severe disturbance.

If the lines are to enter the building through a telephone cable (in which the wires are paper insulated, they first

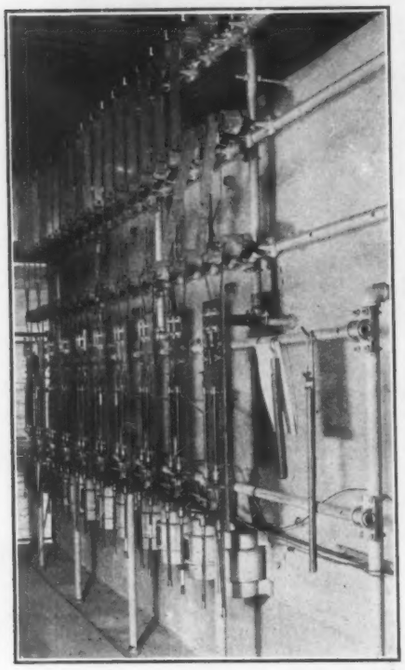


Fig. 8. Telephone protective equipment used between terminus of 4,000-ft. cable and switchboard.

must pass through another fuse device known as a heat coil which should blow instantly with ½ ampere and in about ½ min. at from ¼ to 1/3 ampere. On the line side of these heat coils should be placed the regular copper blocks separated by standard dialectrics as used by telephone companies. The copper blocks should have a small hole bored in the center and this hole filled with solder so that a heavy discharge between blocks, if continued, will fuse the solder across the gap and short the circuit on the line side of the cable. If this cable is of short length, it may be connected directly to a regular switchboard without further protection. If this cable is over 1,000 ft. in length another set of heat coils and copper blocks should be used at the terminal before connecting to the switchboard, as the electrostatic capacity of the cable pairs may be such that when combined with the inductance of the connected windings a near-resonant condition may be experienced during a disturbance. If the above-described protective equipment is properly installed a modern telephone switchboard may be connected to the cable and operated with perfect safety to the apparatus and to the operator.

The whole protection scheme used ahead of the telephone cable is shown in Fig. 8, and the protection between the long run of cable (in this case 4,000 ft.) and the switchboard is shown in the far corner of the room (Fig. 9). To the left in Fig. 9 is shown a motor-generator ringing set mounted on a table, while attached to the left-hand end of the table is an interrupter and pole changer which has for its supply the 48-volt battery (Fig. 10) used as the main battery supply for the switchboard. To the extreme right of Fig. 10 is shown an emergency battery consisting of four 12-volt automobile storage batteries in series. These two batteries are charged alternately by a 10-ampere mercury-arc rectifier shown at the center in Fig. 9. At the extreme right in Fig. 9 is the power panel controlling the batteries, the charger and the ringing set. The interrupter and pole-changer ringing set is equipped with a relay so arranged that the motor-generator ringing set (the motor of which is connected to the 110-volt lighting circuit) is normally supplying the ringing current, but if the supply to the motor should fail this relay connects the pole changer which then operates until the motor again starts.

Referring again to the protection between the open-wire lines and the telephone cable as shown in Fig. 8, it often happens that a fuse or a heat coil will blow and not be noticed by the substation operator and thus leave the line out of servie. To prevent this all fuses are connected to one alarm circuit and all heat coils are connected to another alarm circuit. Thus the operator knows at once when either a fuse or a heat coil has blown. As he walks in front of the equipment he may easily see which one is open, as

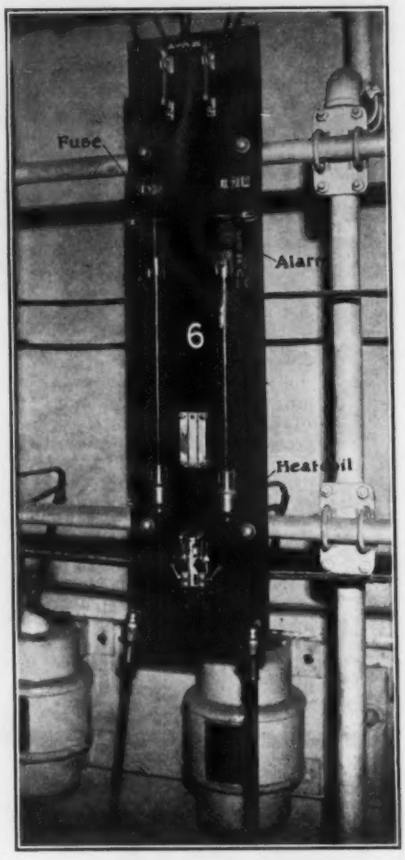


Fig. 11. Typical telephone circuit protective panel showing alarm arrangement on fuse and heat coil.

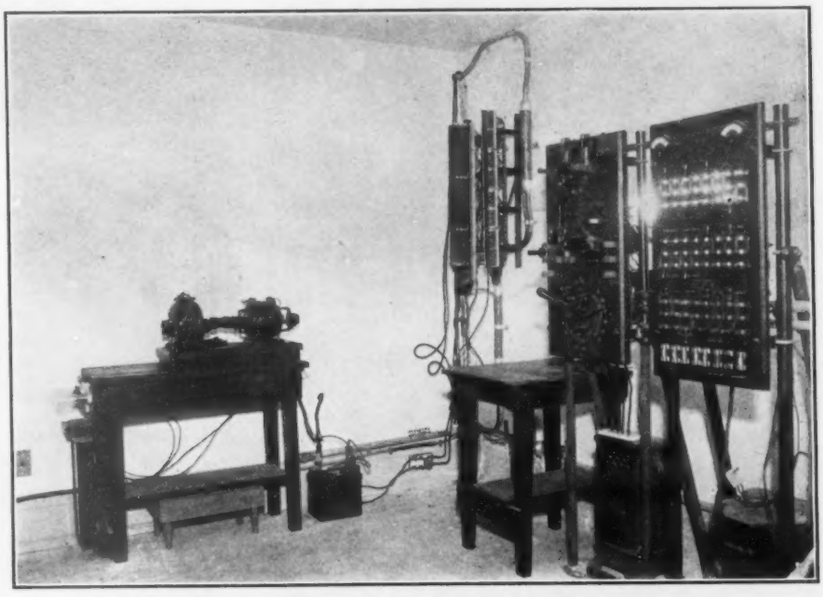


Fig. 9.—Showing motor-generator ringing set, battery-operated interrupter and pole changer, battery charging panel and battery control panel.

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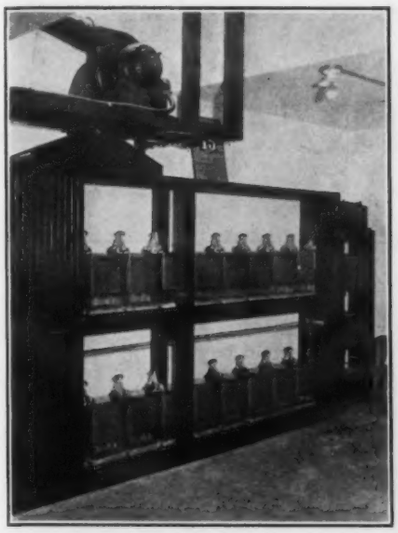


Fig. 10. Main and emergency 48-volt telephone batteries.

shown by the difference in the position of the fuse holders and heat-coil springs as shown in Fig. 11.

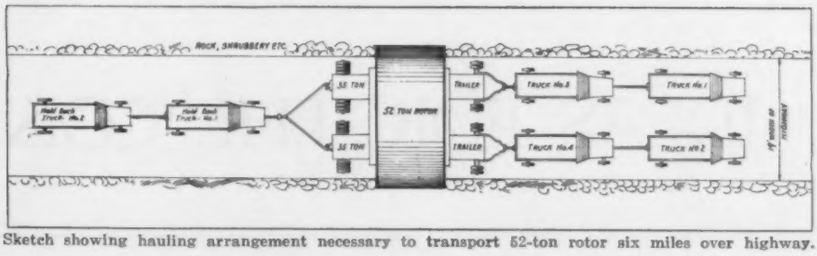
This covers the protection necessary for telephone lines of power companies when the wires are carried on the power poles and where these lines enter substations, power houses, load dispatchers's office, or the main office of the company.

Editor's Note: This is the concluding half of the first of a series of articles by Mr. Kalb in which he outlines the special features of power company telephone systems and the protective equipment involved. The second article will appear in an early issue.

Movement of 52-ton Rotor Affected by Highway Law

State highway regulations materially entered into the movement of the three main pieces of the new 40,000-kva. synchronous condenser for the Vaca-Dixon substation of the Pacific Gas and Electric Company. The two halves of the stator each weighed 40 tons while the rotor weighed 52 tons. It is obvious that special arrangements were necessary to bring this tremendous loading within the highway commission's regulations, which call for a maximum of 750 lb. per in. of rubber in contact with the road surface.

In one of the accompanying illustrations is shown a photograph of the trailer equipment when loaded with one of the stator pieces. In the other illustration is shown schematically the hauling arrangement necessary for the 52-ton piece. On hills it was necessary to use four 7-speed Fageol trucks pulling on the upgrade and two holding back on the downgrade.



Sketch showing hauling arrangement necessary to transport 52-ton rotor six miles over highway.

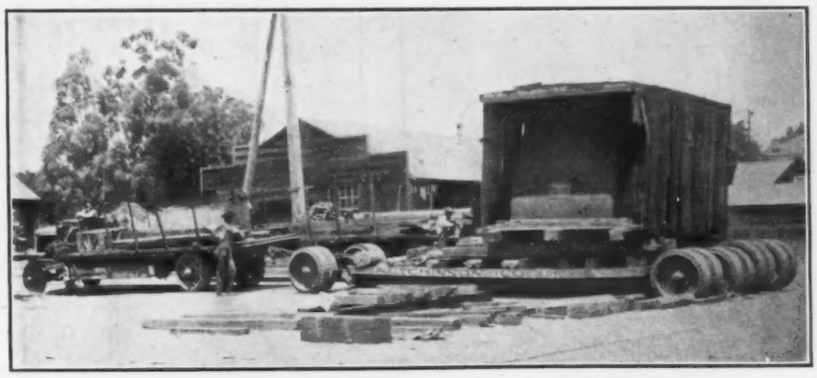
From the sketch it may be noted that the transportation medium consists of two 35-ton trailers lashed together to form one carrying bed of sufficient size to carry the heavy pieces. Each trailer was equipped with six 8-in. dual-rubber-tired wheels, giving a total of 192 in. of rubber in contact with the highway. The overall width of this equipment as arranged was 19 ft. 6 in. The highway for the most part is 20 ft. wide.

Due to blocking the highway it was necessary to move after midnight and to take all precautions to protect the traffic and facilitate its normal movement with the least possible delays. The distance of haul was about six miles. In this distance there were a few places where detours could be provided and other places where it was necessary to collect the traffic in wide places at the roadside to await the passage of the caravan. The safe handling of traffic was accomplished by placing large signs, well illuminated by lanterns and guarded by watchmen, across the highway to direct this traffic into the wide places or into detours where such were available. As soon as a closed section of road could be traveled by the caravan, traffic was cleared in both directions and then the next section closed. A maximum speed of three miles per hour was required by the highway commission.

The wife and daughter of Colonel Berry, camp commandant, came to the gate after taps and demanded admission. The sentry objected.

"But, my dear man, you do not seem to understand," expostulated the older woman."We are the Berrys."

"I don't care if you are the cat's whiskers," retorted the sentry. "My orders are to let no one pass at this hour."—Two Bells.



Showing 40-ton section of condenser stator loaded on parallel trailers.

Hollow-Core Concrete Poles Are Claimed Economical

Offering at least one possible solution to the problem of the growing timber scarcity is the new Hollowspun reinforced-concrete pole. This pole is manufactured by the Westinghouse company, which claims for it longer life, increased safety factors and greater strength. It is designed for use in telephone, telegraph, trolley and transmission lines.

Concrete poles for these classes of service require a relatively high percentage of tensile and shear reinforcement. To obtain this quality the section of the individual rods is kept to a minimum and a horizontal wrapping is provided against shear failure. The resulting cage of reinforcing material is so dense that it is not possible to force the aggregate sufficiently compactly into place by ordinary methods. It is essential that the concrete mass be dense to protect the steel and to reduce the size of the pole.

In this process the reinforcing steel is calculated carefully for the particular class of pole to be made. The complete reinforcing cage is placed in a horizontal form and held in the proper place by concrete buttons which become a part of the finished pole. Aggregate then is added and the entire mass rotated at a high speed. The centrifugal force developed is sufficient to compact the concrete into a dense wall and leaves an open core running the entire length of the pole.

Removable steps for these poles may be provided for by embedding bronze inserts in the concrete at the time of forming, steps to be mounted in these inserts as desired. Provision for mounting of standard crossarms and other accessories now in use also can be applied to these poles.

It is claimed that the use of these poles makes possible an increased pole loading and thus effects an economy by reducing the necessary number of poles per mile or by increasing the number of conductors without any reduction in operating safety factor. Maintenance costs also are claimed to be at a minimum. Further, the attractive appearance of these poles might make them desirable where they occupy positions on or adjacent to prominent thoroughfares.

Optomist: "What's a ten-letter word meaning a hold-up?"

Pessimist: "I'll bite. What is it?"

Optimist: "Suspenders."

A danger sign cannot talk, but it is not half so dumb as is the fellow who disregards it.

He is well onward in the way of wisdom who can bear reproof and profit by it.

IDEAS FOR THE CONTRACTOR

Electrical Estimating for the Contractor — V

Discussion of Electric Motor Drive for Woodworking Machinery and a Recent Installation

By J. R. WILSON*, Engineering Department, Los Angeles Electric Works

One of the hardest duties for electric motor drive is offered by woodworking machinery. This is due to three primary causes which appear in this class of machinery, perhaps more than in any other type of machinery driven by motors.

These causes are: multiplicity of belts, change of bearing friction due to weather conditions, and difference in fibre structure of raw material. Due to the manufacturers' desire to make each machine cover as wide a range of different designs of finished product as possible, most woodworking machines are quite complicated. In order to keep down the investment cost the majority of these machines usually are driven by a single motor. This of course necessitates a considerable number of shafts and belts in order to perform the different operations for which the machine is designed.

In a further effort to keep down the investment cost and also to reduce the floor space required by these machines, these belts are worked on very short centers. This necessitates running the belts much tighter than would ordinarily be considered good practice; this in turn imposes an extra strain on the motor.

A multiplicity of shafts of course entails a multiplicity of bearings. Due to the extra high speed at which these shafts must be driven in this type of machinery, a heavier than ordinary grade of oil generally is used on these bearings. Perhaps this would not introduce any complications under circumstances where the local temperature could be made to remain constant at all times. In most woodworking plants, due to the fire hazard, heating of the plant is given very small consideration. Therefore, the room temperature in the fall, winter and early spring months is liable to be quite low.

This condition will be reflected very much in the difficulty experienced in starting this class of machinery during the cool months of the year. This difficulty is increased in direct ratio to the heaviness of the oil used in the machine bearings. It is surprising how much resistance can be offered by a few bearings in which the oil has congealed. The period of time during which this resistance will maintain depends directly upon the room temperature and the rate at which the shaft friction tends to warm up the oil. This extra demand will be imposed upon the motor during the time it takes the bearing oil to reach its normal operating temperature.

The third primary cause mentioned, change in fibre of raw material. is liable to occur at anv instant of the machine's operation. This may appear as an extra hard grain in a certain run of lumber. or it may appear as knots and faults in only one separate piece. This of course imposes an additional strain on the motor. This added strain may remain only an instant if the hard spot is small, or may extend over a considerable period of time, as in the case of a long piece of lumber being operated upon.

Due to keen competition, most manufacturers of woodworking machinery are prone to specify a motor of sufficient horsepower capacity to handle the load only under the best of operating conditions. A motor driving one of these machines may be required to deliver 50 per cent over normal rating for a considerable period of time. A 50 deg. motor seldom will meet the requirements of woodworking drive, unless of a horespower capacity greatly in excess of the actual demand of the normal load.

Operating conditions may vary to a considerable degree between two plants making identical products. A motor drive that would be ideal for one plant might fall far short of meeting the requirements of another of the same general type. This rule of course also applies to the manufacture of any product. All these things should be taken into consideration when planning an electrical layout for a woodworking plant.

One of the pleasures a competent electrical estimator gets out of his profession is in designing an efficient plant layout which will result in the least possible expenditure of money on the part of his customer. (One of the "glooms" he gets is when he does design such a layout and some other contractor puts in an inferior installation.)

Keeping the above facts in mind it may be interesting to review the high points in a recent installation made for the American Hardwood Company. As the name implies, this plant handles hardwood, which adds another complication to those already enumerated. The owners wished to install a plant of the highest efficiency using only the latest types of machinery, best of installation materials, and motors of ample horsepower capacity.

While it was a competitive job only three contractors were allowed to pre-

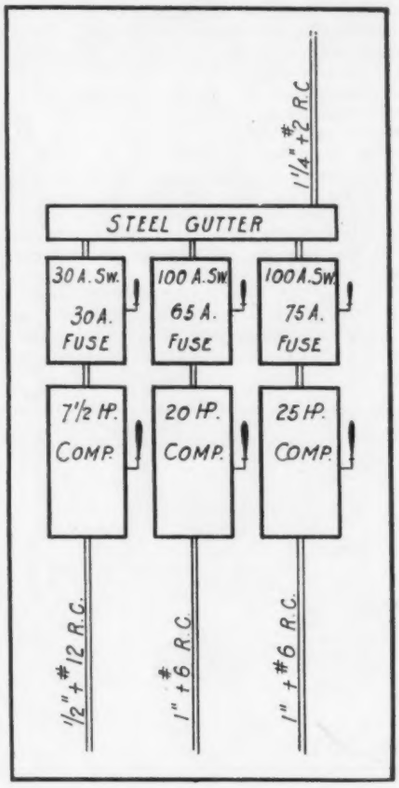


Fig. 1

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TABLE I.

EQUIPMENT OF AMERICAN HARDWOOD COMPANY.

Motor H.P.	R.P.M.	Drive	Control	Machine
30	840	Coupling	Manual Compensator	Rees Manufacturing Co. 50-in. slow speed blower
25	1150	Belt	" "	American No. 26A moulder
25	1750	Belt	" "	American No. 2 rip saw
25	3510	Direct	" "	American No. 666 surfacer
20	3487	Direct	" "	
7½	870	Gears	" "	
5	3450	Direct	Remote Control	Jointer
5	1750	Direct	Remote Control	American swing saw
1	1750	Direct	Ex. Op. Sw.	U. S. Manufacturing Co. double-end grinder
56½	Future			
200	Total Capacity			

pare estimates. All were known to be competent and experienced in making woodworking installations.

The general data on the job was as follows:

Present horsepower	143½
Ultimate horsepower	200
Voltage	440
Cycles	60
Building	1 story
Floor	6 in. concrete (in place)

Table I shows the machines to be driven, with the horsepower of each.

There were four interesting features to this job:

First: The surfacer carried three motors, two of which were direct-connected to the cutting knives and one driving the feed tables through a gear

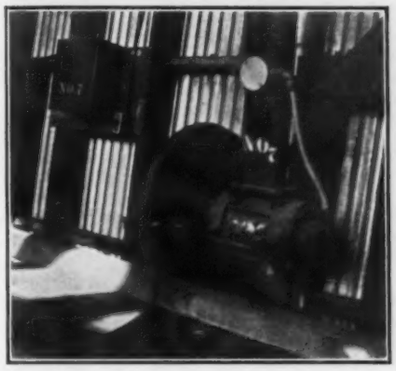


Fig. 2.—The swing saw.

train. As this machine was placed on the opposite side of the room from the balance of the equipment, it was decided to place the control all at one point, adjacent to the machine. This necessitated the only subfeeder in the installation. A plan of this subfeed board is shown in Fig. 1.

Second: The compensators controlling the motors on both the moulders and the ripsaw had to be mounted on the wall, quite a distance from where the operator would normally stand. In order to provide a method of stopping the motors in an emergency, a "normally closed" control button was placed at the operator's station on each machine. These buttons were wired in series with the "no-voltage release" coil circuit so that pressing the button opens the circuit and instantly causes the compensator to return to the "off" position.

Third: The swing saw is one of the usual type with the motor at the lower end. This motor is controlled by a G. E. No. 7005 remote control switch mounted on the wall, adjacent to the machine. In order to provide the maximum in convenience of control, the start and stop button was mounted on the machine just above the motor, using flexible conduit at the top of machine in order to allow the saw to swing. This arrangement is shown in Fig. 2.

Fourth: The blower and its motor were mounted on a platform about 15 ft. above the floor level. The motor weight was 1,000 lb. and the blower weight was 1,170 lb. It was part of the electrical contractor's job to help raise this equipment in place. This was necessary because the customer was placing the machinery with his own men. Everything except the blower equipment was placed at the floor level, and the customer could handle it with the tools he had.

The electrical contractor was supposed to have the necessary chain hoists to place the blower equipment so it was made a part of this contract. In order to provide the proper hoisting equipment, reference was made to a table which has proved its worth many times. This table is reproduced here as Table II. No credit is claimed for originating this table, but unfortunately the original author's name has been forgotten.

Fig. 3 shows the layout for the main switchboard, and Fig. 3-A gives a general view. The switches, etc., were mounted on a wood backing as the customer had plenty of lumber on hand and did not care to pay for an angle-iron frame.

The estimated costs for this job were as follows:

Switches and fuses	$216.89
Conduit and fittings	90.36
Wire	70.50
Sundries	5.25
Inspection	15.00
Labor	175.00
Total	$573.00

It is interesting to note that the actual materials used were within 2 per cent of the estimate, and the actual labor charge was within 1½ per cent of the estimate.

TABLE II

SAFE LOADS IN TONS FOR ROPES, STEEL CABLES, WROUGHT CHAINS

Manila Rope				Steel Cables				Wrought Chains			
Dia. in Inches	One Part	Two Part	Four Part	Dia. in Inches	One Part	Two Part	Four Part	Dia. in Inches	One Part	Two Part	Four Part
½	⅛	¼	½	½	1	2	3½	¼	½	⅞	1½
⅝	¼	½	¾	⅝	1¾	3¼	6½	⅜	1	1¾	3
¾	⅜	¾	1¼	¾	2½	4½	9	½	2	3½	6
⅞	½	1	2	⅞	3¼	6	12	⅝	3	5	9
1	¾	1½	2½	1	4	8	16	¾	5	9	15
1¼	1	2	3	1¼	6	12	24	⅞	6	10½	18
1½	1¼	2½	4	1½	10	19	36	1	8	14	24
1¾	2	4	6	1¾	13	25	48	1⅛	11	19	33
2	2½	5	8	2	16	32	60	1¼	13	23	39
2¼	3½	6½	11					1½	18	32	54
2½	4½	8	13								

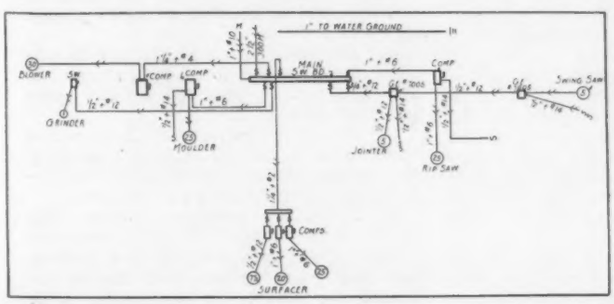
NOTE.

The above named terms, "One Part," "Two Part," "Four Part" are as follows:

A "One-Part" line may be any line supporting a load or attached to a load for moving same, either for direct pull or around a pulley or snatch block.

A "Two-Part" line may be any line which is run through two single sheave pulleys or blocks arranged for pulling or hoisting loads.

A "Four-Part" line may be any line which is run through two double sheave pulleys or blocks arranged for pulling or hoisting loads.



Schematic diagram of power wiring for American Hardwood Company.

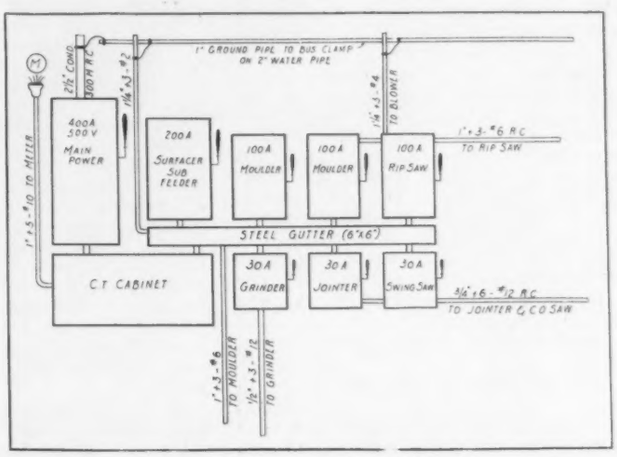


Fig. 3.—Diagram of main switchboard.

Another point that may be of interest is the method used in arriving at the estimated labor cost. The writer always uses three methods of checking the labor on a job. Each of these methods is based on data collected during a long and varied experience with "average labor costs." Each method has its advocates, and a man is naturally prone to favor the one which has proved nearest to being infallible.

The first method is the "experience" method and consists in visualizing the job in each of its component parts and placing a charge, based upon experience and judgment, against each part. The present job was treated in this manner with the following results:

Service, main board and ground	$40.00
Surfacer and subfeeder to same	42.50
Blower	27.50
Moulder	15.00
Rip saw	22.00
Jointer	10.00
Swing saw	10.00
Grinder	8.00
Total	$175.00

The second method of labor estimates on power installations is by the horsepower method. This method consists in computing the installation cost by multiplying the actual connected horsepower by a certain dollar factor. This factor varies with the type of building and the average horsepower of the individual motors. It is safe only when backed up by a vast amount of actual personal experience in erection and installation methods, on which actual labor costs have been kept. By this method the present job would show an

Fig. 3-A.—The main switchboard.

estimated cost of about $1.20 per hp. This appears too low, as the writer uses an average price of $1.70 per hp. for a job of this nature.

The third method is by the percentage method. This is percentage of material cost against labor cost. The writer's personal data show an average cost of 45 per cent of materials cost as the cost of labor on this type of job. This would give the present job a labor factor of $172.35, which was very close to the estimate of $175. This method must be based also upon actual personal data.

In the final analysis of any job the estimator's personal experience and judgment must be the preponderant factor.

Our next installment will deal with the power installation in a large furniture manufacturing plant which had some very interesting features and also some problems to be solved.

Co-operation Between Contractors and Inspectors

A Discussion of This Problem and an Outline of the Method of Successfully Solving It in Los Angeles

To attain the maximum of efficiency and the minimum of inconvenience to the public, all electrical contractors and inspection departments should work in the closest possible harmony. Inspection departments should consult with their local contractors when new rules are being considered, and the contractors should avail themselves of the opportunity to offer suggestions along lines of constructive legislation.

City electricians and chief inspectors should be available for consultation with the contractors during office hours. Judgment should be used of course by both sides, and the contractors should not bother "those higher up" when the decision of a deputy inspector will answer just as well. On the other hand the city electrician and chief inspector should not be bound up in so much red tape that it is impossible to consult them upon matters of real importance to the contractor.

Los Angeles has worked out this problem in what has proved to be a very logical manner. R. H. Manahan, city electrician, and H. M. Beecher, chief inspector, are available at the city hall during regular office hours to the contractor who has any problem whose importance seems to warrant their attention.

Mr. Manahan besides being city electrician, also has direct charge of the city police and fire alarm systems, all traffic signals systems, and the huge street lighting program which now is being followed in Los Angeles. With all his multitude of duties he still remains one of the most approachable and "regular" of fellows. His office is located on the main hallway of the electrical inspection department and his door is always open. He believes in the "open door" policy of running an inspection department and practices what he preaches.

On Tuesday of each week the Electrical Contractors and Dealers' Association has a lunch meeting, which all contractors try to attend, and for a most excellent reason. Mr. Manahan and Mr. Beecher always attend these lunches, and it is an open forum for all those interested in the electrical construction industry of Los Angeles.

From 12 to 12:30 is devoted to good fellowship and excellent food which is prepared on the electric range under the supervision of Helen Mikesell, the Association secretary. From 12:30 to 1:30 is devoted to a discussion of new rules pending, interpretation of rules, complaints on inspection rulings, method of construction in other cities, suggestions on new rules and similar subjects of interest.

Any contractor who feels that an inspector has done him an injustice in any way is given an opportunity to state his case. If his complaint appears justified he will receive the hearty support of the other contractors present and will always receive a fair and just decision from Mr. Manahan and Mr. Beecher.

Besides those directly engaged in the contracting end of the game representatives of the switchboard manufacturers, the power companies, the General Electric and Westinghouse companies, and others attend these meetings.

The old saying, "If you have an idea and I have an idea, and we exchange ideas, then each of us has two ideas," is excellently illustrated by these meetings. The feeling of harmony and cooperation existing between the electrical contractors and the inspection department is wonderful for a city as large as Los Angeles. The work of the inspection department is lessened through the better understanding the contractors now have of the correct meaning of the code rules.

The individual contractor is doing a better grade of work with less resultant "corrections." This makes for quicker inspections, thereby releasing more inspectors to work on the condemning of "old fire traps," which results in more work for the contractors. A contractor never should allow anything to prevent his attendance at these meetings, such attendance being a duty to himself, his city and the calling he represents.

Any community which has an inspection department and electrical contractors doing business in it would do well to adopt the Los Angeles idea. The benefits which accrue to the general public through added safety to life and property and the benefits to the contractors as individuals are excellent reasons why such meetings should be held.

Telephone Company to Place all Wiring for Telephone Service

The Pacific Telephone & Telegraph Company recently issued a supplement, known as 1-P, to specifications E-3002, The Design of Fixtures for Telephone Service in Buildings. This supplement became effective Oct. 1, 1925, and provides that all telephone wiring in buildings must be installed by that company.

A copy of the supplement follows:

1. Necessity for Issuing Supplement. This supplement defines the position of the Telephone company in respect to the utilization of wiring provided in buildings by their owners.

2. The Telephone company is responsible for providing efficient and satisfactory telephone service and these responsibilities can be met only by the Telephone company furnishing all wire facilities used in providing telephone service.

3. Attention is called to the company's published rules and regulations under which the Telephone company is not required to connect to wires placed by others.

4. Roughed-in wires are not in accordance with the company's standards and will not be provided by the company or used by it.

5. Roughed-in wires are those which are placed in such a manner that they are not readily and individually removable when the building is completed.

6. Hereafter, therefore, where such wires are encountered the Telephone company will refuse connection thereto and will place wires when and as required for service in conformity with the company's installation standards.

Standard Method of Wire Marking Adopted by Contractors

The Electrical Contractors and Dealers' Association of San Francisco recently devised a standard method of marking the ends of wires in installations made by their members. The question of determining the use of wires roughed-in by another journeyman has always been a problem when finishing up jobs.

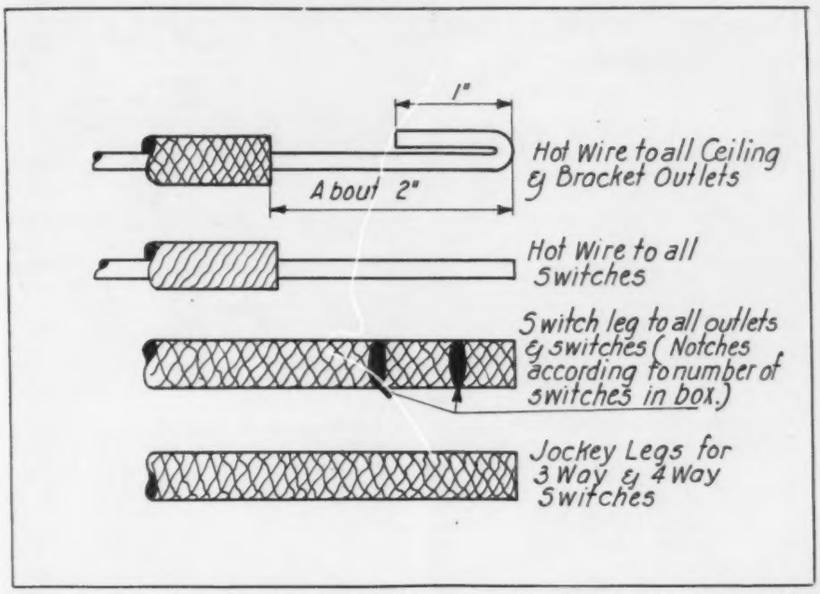
By having the men mark the ends of the wires as shown in the accompanying diagram there is no question about the use for which they were installed. In this way a great deal of time is saved in tracing out the different wires and circuits. Even though the same man who roughed-in the work may install the finish, it is almost impossible to remember the use of the wires without some marking.

By establishing a standard marking it is only necessary for the journeymen electricians to learn one system which is used universally by the contractors of the city.

For bell work the marking consists of knots made in the wire as given in Table 1. A similar method of marking is used for apartment telephones. This is given in Table 2.

Table 1—Bell Work

0—Knots in wire for wires from buttons to bells.


1"
About 2"
Hot Wire to all Ceiling & Bracket Outlets
Hot Wire to all Switches
Switch leg to all outlets & switches (Notches according to number of switches in box.)
Jockey Legs for 3 Way & 4 Way Switches

Standard method of marking wires that identifies the use for which they have been installed.

1—Knots in wire for battery wires to buttons.

2—Knots in wire for battery wires to bells.

Table 2—Apartment Telephones

0—Knots—For individual ringing wires from vestibule to each apartment.

1—Knots—For common talking wires from vestibule to all apartments.

2—Knots—For common door opener wire from door to all apartments.

3—Knots—For common battery and transformer wire to all apartments.

4—Knots—For battery to vestibule wire.

5—Knots—Transformer to vestibule wire.

Contractor's Model House Opened as Electric Home

An electrical home of unusual interest recently was opened to the public in Chico, Calif. William J. Shalz, a contractor and builder, built this model home for himself. The display was organized by LeRoy Crandall of the California Electrical Bureau and was managed by A. A. White, of the Pacific Gas and Electric Company.

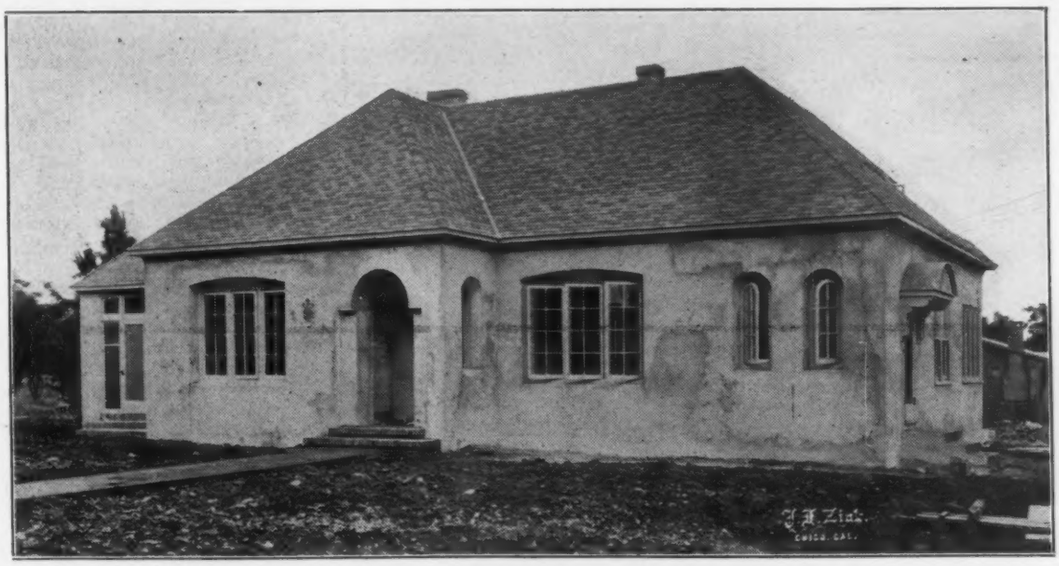
The home was equipped completely, including electric water heaters, air heaters, range, and refrigerators. During the display of the home especial emphasis was placed on electric refrigeration and the saving as compared to ice refrigeration was called to the attention of visitors.

One of the features in connection with the display of the home was a stream of colored lights from the Sycamore swimming pool to the electric home just south of the pool. The house also was floodlighted, and this attracted many people who nightly swim in this pool.

As a result of the home two prospects, who originally had planned to install electric ranges only, decided to install electric water heaters, air heaters and refrigerators in duplication of the model home exhibited.

A leaflet which contained a picture of the home, details of the display dates, and names of the electric dealers and others who supported the home was mailed to every lighting consumer of the Pacific Gas and Electric Company in the Chico territory. It also contained a little synopsis of what the modern electrical home should be.

The electrical wiring and equipment was provided by the electrical industry of Chico, including Conery & White, Bird Electric Company, Chico Electric Company, Boblet Manufacturing Company and Fisher Electric Company.



This model electric home was built by a Chico contractor and builder for his own use. It was opened to the public before being occupied.

BETTER MERCHANDISING

Homey Touch Effective in Pomona Establishment

Fixture and Appliance Display and Arrangement, Tasteful Decoration, Give Store Unique Distinctiveness

Fixture and appliance displays are like anything else. There are fixture displays—and then there are fixture displays. The thing which singles out one such display from all others is the quality of originality with which it is prepared. In this respect the store of C. W. Jones, the Pomona Fixture & Wiring Company, of Pomona, Calif., is unique.

Characterized by a thoughtfully planned use of floor space, a separation of the working and stock departments from the display rooms by distinct lines, and tasteful arrangement of display rooms and show cases, the Pomona establishment has set a high standard for stores of this character.

Each section of the store, from the front windows, through the display rooms, even to the shop itself, has distinctive features. The front display windows are made extremely flexible of arrangement because of the fact that the floor is removable, set up on special horses. The main floor underneath is finished, so that displays may be set upon it if occasion requires. The backs of the store windows are also removable. Other sections of back for the windows have been made so that they may be used alternately or in combination with the original backs. Glass or wood panels may be used at the option of the window dresser.

Outside the front entrance a weatherproof outlet has been installed for use in demonstrating washing machines or refrigerators out of doors. Two outlets also are provided, one on each side, for the requirements of special displays at the sidewalk.

Four circuits have been run to each window, making possible many color effects. By means of a flasher these may be varied automatically at night.

Inside the store, instead of the usual counters ranged alongside the walls of the store with the stock on shelves behind them, the counter has been made in the form of a rectangular, full-display, plate-glass show case, in which the appliances are displayed on glass shelves. The show cases themselves are illuminated so as to bring out every feature of the merchandise displayed. Outlets have been provided to demonstrate appliances conveniently.

Along the walls special display cases for appliances have been built, lighted from within, and having glass shelves upon which the merchandise rests. A small shelf in front of each wall case enables the sales clerk to take the appliance down, place it upon the shelf, and demonstrate its good qualities to the customer. Outlets have been provided in the jogs of the wall cases for easy access to any appliances thus displayed. The stock cases, below the wall display cases, are provided with sliding wooden panels, and the stock itself is set upon glass shelves inside them. Each table lamp has an individual compartment.

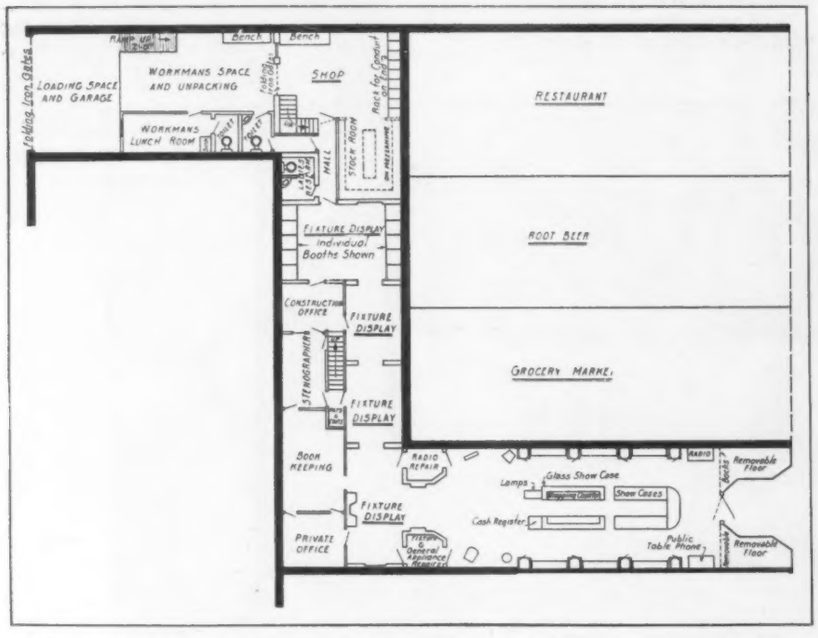
Illuminated glass signs above the wall cases tell of the appliances the store has for sale, such as vacuum cleaners, Mazda lamps, electric heaters, radio equipment, washing machines, as well as wiring supplies, table appliances, everything electrical. A circuit placed above the cases provides for the lighting of the walls from concealed floodlights.

Leading into the fixture display rooms and offices is another illuminated glass sign, placed beneath an archway beautifully decorated and surmounted by a grillework. The fixture rooms are thus cut off from the front part of the store, occupying a space as shown in the ground floor plan accompanying this article.

For the more individual display of electric fixtures, special appointments have been provided to make this section of the store of distinctive nature. Instead of one room, into which would be crowded several fixtures, none of which would have sufficient space for proper display, Mr. Jones has arranged to provide several display rooms, limiting the number of fixtures in each to a minimum. Better display of each thus is provided.

The first display room, opening off the main store, is larger than the others. Hominess has been made the keynote of these display rooms, good furniture, well arranged, being provided to give this effect. The fixtures used are hung at intervals from the ceiling, some wall brackets also being used. For the display of table lamps and group brackets, separate booths have been provided. Outlet plates and tumbler switch plates have been made easily accessible and yet have been decorated with the same coloring used on the walls.

In the several smaller rooms for the display of fixtures, chairs, davenports, mirrors and homelike furnishings have been provided. The carpets on the floor are restful, and smoking stands are provided near the chairs for the comfort of men who come to see about fixtures for their homes. There are radio outlets in every room, and many electric heaters in small artificial fireplace mantels. Every fixture on display can be lighted up, three having been arranged on each switch, staggered so that they may be segregated. One room has a lower ceiling so that the fixtures may be examined more closely. The walls have an oil finish which makes them easily cleanable.



Sketch of the floor plan of the Pomona Fixture & Wiring Company's store, showing the arrangement of the main store, fixture rooms, offices and the separation of the shops into a wing of their own

UNIQUE in many respects is the Pomona Fixture & Wiring Company's store. 1. The main merchandising section of the store, with the wall display cases, and special show-case counter in the center. 2. The main fixture display room, with individual booths for table lamps. 3. A series of individually appointed display rooms, each arranged with a homelike atmosphere, provided with radio and all the comforts of home. Fixtures are given more effective display here.

NEWS OF THE INDUSTRY

Southern California Edison 1926 Budget to Be $32,558,000

Increasing its annual budget for construction, extensions and betterment, $7,000,000 over that of last year, the budget of the Southern California Edison Company, Los Angeles, for 1926 will be the largest in the history of the company, amounting to $32.558 000.

The principal items in the tentative budget are: $10,958.000 for additional water power development on the Big Creek-San Joaquin project and a new transmission line; $8,000 000 for the completion of the new 70.000-hp. addition to the steam plant being constructed at Long Beach with provision for additional units in the future, and $13,600,000 for additions to substations and extensions to distributing lines to serve new customers.

Included in the item of $10,958,000 for additions to water-power development will be the cost of completing the Florence Lake reservoir to a total capacity of 60,000 acre-ft., the construction of a tunnel 13 ft. in diameter and 6½ miles long between Huntington Lake and the new Shaver Lake reservoir, and the first year's work on the Shaver reservoir itself, which will ultimately have a capacity of 138,536 acre-ft. and will be the largest on the company's system. Money is included also for beginning the construction work of the 115,000-hp. generating station located on Big Creek. Construction work on the 225-mile 220-kv. power transmission line to convey the water power so generated from Big Creek to southern California will be carried on actively during 1926.

Increasing the capacity of the Long Beach steam plant to 260,000 hp., the new 70,000-hp. addition will be the largest steam turbine as yet installed west of the Mississippi River. Over seventy-five substations either will be built or will have their capacities materially increased during the coming year. The lines serving these substations and distributing the power from them are included as items in the $13,600,000 for additions and miscellaneous betterments.

Bill Would Permit Cities to Sell Power Outside Limits

Enactment of a law to permit cities owning or operating their own electric plants to sell power outside their corporate limits will be requested of the Washington state legislature when it convenes in special session Nov. 9. The bill has been drafted after conferences between representatives of Tacoma and Seattle and cities in western Washington desirous of obtaining power from the municipal plants of the two larger cities.

The bill provides that a city may sell any surplus energy to any other municipal corporation or governmental agency which owns or operates its own distribution system and which is situated within 75 miles of the corporate limits of the city owning the generating plant, or within 25 miles of its transmission lines. It provides also that sales may be made to any person, firm or corporation within 10 miles of the city generating the power, or within three miles of its transmission lines. These restrictions, according to backers of the bill, would prevent cities from going into the wholesale power business such as the Bone bill would have permitted.

Unlike the Bone referendum measure defeated at the general election in Washington in 1924, which made no provisions for a tax on sales outside the cities, the proposed bill provides for a 5 per cent tax on all such sales. This tax is to go to the state.

Fixing of the rates on power sold outside will be kept from control of the state department of public works by giving such power to the cities. It is provided, however, that such rates shall not be in excess of 15 per cent, inclusive of the state tax, more than the rate charged in the city. Outside users are safeguarded, those sponsoring the bill contend, by a provision to the effect that the city cannot discontinue the sale outside because of a demand within the city, nor for any other cause except as provided for in the rules governing consumers within the city.

The bill would permit cities having power to sell to build betterments to its plants, extend transmission lines and distribution systems to the point of consumption, but would prohibit them from acquiring or maintaining a distribution system in any other city or town. This would make it necessary, it is pointed out, for other municipal corporations buying energy to distribute their own energy after it has been purchased from a city generating it.

Five per cent of the gross receipts for sale of energy outside the city limits shall be remitted to the state treasurer every month and shall be deposited by him to the credit of the state general fund, the bill provides.

The proposed bill, its backers declare, will be introduced early in the session, and prompt action on it will be urged by sponsors of the measure.

Pit No. 4 License Sought.—The Mt. Shasta Power Corporation pursuant to its preliminary permit of May 5, 1923, has applied for license covering Pit No. 4 site on Pit River, near Redding, Calif. The power is to be sold to the Pacific Gas and Electric Company. The development will make available 56,880 hp. of primary power. It is proposed to install three 40,000-hp. generators.

Evaluate Utilities' Distribution Systems in San Francisco

At hearings held in San Francisco in connection with the proposed acquisition by that city of a system for the distribution of Hetch Hetchy power, engineers of the California Railroad Commission placed a tentative valuation of $10,439,990 on the physical properties of the Great Western Power Company within the city limits, and $24,914.510 on those of the Pacific Gas and Electric Company. The figures set by the latter company on its properties was $55,000,000.

The valuation figures included lands, power plants, poles, towers, fixtures, meters and street lighting equipment. Items such as severance damages, good will, additions and improvements made since Feb. 11, 1924, were not included. The physical properties of the Uuiversal Electric Company, a small company owned jointly by the Great Western company and the Pacific Gas and Electric Company, were included in the valuation of the former company's properties, and when final figures are presented the valuation of the Universal company's property will be divided with the Pacific Gas and Electric Company.

The hearing of the Great Western Power Company was continued until Dec. 4, as its final figures will not be ready until then, and that of the Pacific Gas and Electric Company to Jan. 12.

Attorneys for the Pacific Gas and Electric Company objected to the hearing on the ground that the Railroad Commission had no authority to enter into valuation proceedings until a condemnation suit had been started, but the objection was overruled by the commission.

New Optional Rate Schedule Put into Effect in Olympia

New optional lighting rates designed to counteract a rate schedule put into effect in Olympia Sept. 1 by the Puget Sound Power & Light Company, and which, according to company officials, will tend to reduce bills of larger consumers in residential districts, were filed with the state department of public works, as a result of a conference held Oct. 5 between officials of the department of public works and company officials.

The conference followed petitions filed previously by more than 75 electricity consumers of Olympia protesting that the company's new rate schedule discriminated against the residential consumer in favor of the large commercial consumer. The new optional rate agreed upon has a service charge of $1.25 a month plus a consumption charge of three cents per kw-hr. a month.

Stave Falls Plant of B. C. Electric Railway Company Opened by Premier Oliver

The Honorable John Oliver, premier of British Columbia, declared open the completed Stave Falls plant of the British Columbia Electric Railway Company, 42 miles from Vancouver, on Sept. 19, in the midst of a party of 150 public representatives from Vancouver and surrounding districts.

At 12:30 noon Mr. Oliver turned a gold key which set in motion the motors on the governor of the fifth and final unit, thus admitting water at an accelebrating speed into the turbine. He received the key a moment before from George Kidd, president of the company, and later was presented with it as a memento of the occasion.

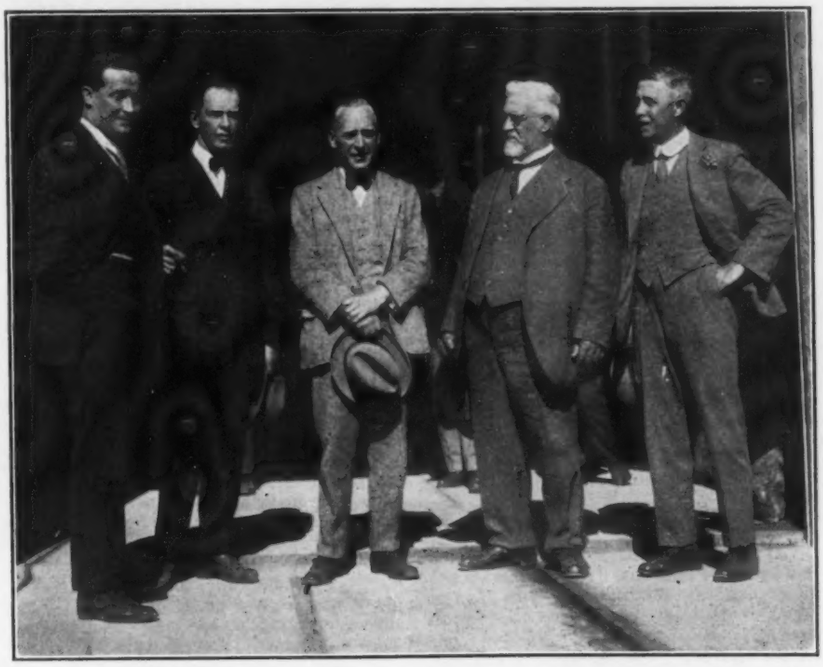
The work, of which this is the culmination, has extended over the last four years. (Journal of Electricity, Aug. 15, 1925, p. 147.) When the Stave Falls plant was taken over from the Western Power Company of Canada in 1920 the British Columbia Electric Railway Company immediately installed a fourth unit of 8,825 kva., bringing the total installation up to 35,300 kva.

In April, 1922, work was begun on the raising of the level of Stave Lake 22 ft. by building the Blind Slough dam and raising the main and intake dams. This work was completed in 18 months. The water storage thus was trebled, and in addition it was decided to proceed with the Alouette development whereby Alouette Lake water is diverted through a tunnel into Stave Lake.

The additional storage and Alouette water made possible a fifth unit of 13,125 kva., and the higher head of water allowed the four original generators to be rewound for the same capacity. The new plant therefore has a capacity of 65,625 kva.

Included in the new work was the building of an outdoor switching station over the tailrace of the plant. In this station provision is made for receiving current from the Alouette plant which will be ready in the fall of 1926. The Alouette plant will be an automatic plant of 10,000 kva. in a single unit. It will be operated entirely from Stave Falls, the turbine being set in motion by throwing in the main power switch.

All this work was inspected by the party on Sept. 19. For the entertainment of the guests the stop logs were removed from one of the bays in the Blind Slough dam so that they might see the force of water stored in Stave Lake. Following that, water was admitted into the penstock of the fifth unit and then the party descended into the power house where the premier made his way to the switchboard gallery and turned the key.



Outside the Stave Falls power plant at the official opening of the fifth unit. Officials of the B. C. Electric Railway Company at the opening ceremony with the Honorable John Oliver, Premier of British Columbia. Reading from left to right: J. I. Newell, electrical superintendent; R. M. Skinner, superintendent of construction at Stave Falls; George Kidd, president, B. C. Electric Railway Company; Honorable John Oliver, Premier of British Columbia; T. G. Murrin, vice-president, B. C. Electric Railway Company

San Francisco Man is Second in Curtis Lighting Contest

In a recent contest instituted by Curtis Lighting, Inc., Chicago, in which suggestions were asked for the best definition of Curtis Lighting, the second prize of $20 was won by Fred A. Gross of San Francisco.

Mr. Gross, who is director of window displays for the Owl Drug Company of that city, with headquarters at 22nd and Mission Streets, submitted the definition: "..changes gloom to glow —and dusk to dawn."

The competition was conducted in all parts of the United States. The first prize, $50, was won by M. A. Godwin, Campello, Mass., who defined Curtis Lighting as "daylight continued."

New 220-kv. Substation for the San Joaquin Valley

Construction is about to be started on the new Wilson substation of the Great Western Power Company of California. This station is to be located adjacent to the Santa Fe railroad about two miles east of Merced, Calif. To serve as a southern terminus of the new 220-kv. tie-line between the systems of that company and the San Joaquin Light & Power Corporation, the station will be an important transmission control point.

The building will be of structural steel and concrete and of sufficient size to house an initial installation of two 25,000-kva. synchronous condensers. Plans and arrangements contemplate the later addition of accommodation for two more condensers, and, of course, the usual control, metering and low-tension switching equipment. The station is so located and arranged that spur track facilities are available and equipment and material may be unloaded from cars by the station crane.

All high-tension bus and switching equipment is to be placed outdoors. The initial installation will provide for two 75,000-kva. transformer banks and space for six 120-kv. outgoing lines, two of which will go in as soon as the bus structure is completed. All of the major electrical equipment is to be supplied by the General Electric Company.

A 220-kv. transmission line will connect the new substation with the present Great Western system at Brighton substation near Sacramento. The length of line will be nearly 104 miles. Twin-circuit 100-ft. steel towers supplied by the Pacific Coast Steel Company now are being erected as fast as three competing crews can erect them. The average span is to be 830 ft. Spacing between conductors will be 16 ft., vertically, and between lines 27 ft., horizontally. Only one line is to be strung as an initial installation. This line is to be of 1.1-in., steel-core, aluminum cable and will be supplied by the Aluminum Company of America. The standard suspension strings will be composed of fourteen 10-in. Locke units and dead-end and transposition strings are to be made up of sixteen Locke high-strength units. Static shields are to be placed between the conductor and the first insulator unit.

Initial operation of the tie-line will be at 165 kv., to be followed later by full 220 kv. The possibility of the future need for 60-kv. and 11-kv. lines at the new substation also is contemplated in the layout plans. A carrier-current telephone is to be installed to provide sure communication between the Great Western dispatching center in Oakland, the new substation and the San Joaquin dispatching office in Fresno.

At the present time 50 per cent of the tower-footing holes have been dug, about 30 per cent of the footings set and some three miles of towers completely erected. June 1, 1926, is the date set for the expected completion of both the substation and three transmission lines. Tower material is being transported to the right-of-way at the rate of about twelve towers per day in an effort to deliver all of the heavy material before weather conditions seriously interfere with transportation over the temporary roads.

Girand Application for Colorado River Rights Taken Under Advisement

Washington Correspondence.

After two days of further hearings on the application of James B. Girand for rights on the Colorado River at Diamond Creek, the Federal Power Commission took the case under advisement. An immediate decision is not expected.

Such uniform opposition to the granting of the Girand license came from all of the states in the Colorado River basin that it is recognized that an unusual amount of political courage would be required to order the license issued. On the other hand the attorneys for Mr. Girand contended that their client had complied exactly with the water-power act. Under these conditions, they argued, a license may not be withheld legally.

On the eve of the hearing the United States Geological Survey issued a report by E. C. LaRue, one of its engineers, recommending a dam which would flood out the proposed dam at Diamond Creek. Before the hearing was ended the State of Arizona formally filed an application for federal rights covering such a project.

The representatives of Mr. Girand contended that the rights of all the states could be protected by including conditions in the license. It was argued that any protection granted by the Colorado River compact thus would be made to apply to his development. L. Ward Bannister, representing Colorado, declared that any such waivers could not bind the commission or the applicant and that they left the third parties to the agreement without recourse in law. He urged that no action be taken until the compact has been ratified by all of the states. He predicted that Arizona would ratify it at the next session of its legislature.

The representative of Governor Hunt of Arizona, opposed any private development on the river in Arizona on the ground that the state is preparing to undertake it. The attorney-general of Arizona contended that Mr. Girand had forfeited his state rights. This Mr. Girand denies. It is his position that he began work on the project within the limits of his state permit, but was stopped by a federal injunction issued at the request of the Federal Power Commission.

George L. Maxwell opposed the Girand license on the ground that it will interfere with the high-line gravity canal intended to furnish water for irrigation purposes.

The contention on behalf of California among other things was that the Girand development would "skim the cream" from the power market and thereby delay the construction of the Boulder Canyon dam for an indefinite period.

Representatives of the Imperial Valley argued that the development at Diamond Creek would increase the low-water flow of the river and give Mexico a claim on a larger amount of water.

Governor Nellie T. Ross, of Wyoming, was firm in her insistence that no rights be granted until the compact is signed. Wyoming is high now, she said, and can take no chances on being high and dry, too. Frank Mondell, former representative, contended that Congress in authorizing the Colorado River Commission had taken the Colorado River out of the hands of the Federal Power Commission. He argued that the Commission has no authority to act until the compact is accepted or rejected.

Long Beach Steam Plant Addition to Start Immediately

Work is to begin immediately on the installation of a 50,000-kw. unit at the Long Beach steam plant of the Southern California Edison Company, Long Beach, Calif. This new installation will conform in general style and plan to the two 35,000-kw. units which make up Long Beach steam plant No. 2, built in record time last year.

An addition to the present structure housing Long Beach steam plant No. 2 is to be built in which to install the new unit. Seven Stirling type Connelly boilers built to operate at 375 lb. pressure and at a temperature of 725 deg. F., are to be installed to operate the unit. Westinghouse condensers are specified. Combination burners capable of burning either natural gas or fuel oil are to be installed to care for the new unit. Additional switch galleries for General Electric oil switches are to be built. A General Electric turbo-generator rated at 50,000 kw., 50 cycle, 3 phase, 11,000 volts, is to be installed.

Estimated cost of the new work has been placed at approximately $6,000,000, and completion date has been set tentatively as July, 1926. Stone & Webster, Inc., who designed and built Long Beach steam plant No. 2, have been engaged to lay out and construct the new station.

New Idaho Falls Office Opened by Utah Power Company

A new store and offices have just been opened by the Utah Power & Light Company in Idaho Falls, Idaho, in the Earl Building south of the post-office. One of the features of the new store is a parcel-checking department, where shoppers in Idaho Falls, many of whom come from near-by smaller communities, may deposit their parcels while engaged elsewhere. Another convenience which has been installed is a completely equipped ladies' rest room.

The new display room for electrical appliances has been attractively arranged, and the entire quarters are said to present a splendid example of up-to-date ideas and efficiency in lighting.

Large Hydroelectric Project Planned in Japan.—Plans are being made by the Mitsubishi interests of Japan for a large hydroelectric project at Chosen through the utilization of the Choshinko River. The energy developed, estimated at 347,000 kw., will be used for various electro-chemical purposes as well as for power and light. The total capital requirements are estimated at 200,000,000 yen ($100,000,000).

Recommends 20,000-kw. Increase to Pasadena Plant

Recommendation that authorization be given immediately for the drawing up of plans and specifications for a new 20,000-kw. unit for the municipal electric power plant at Pasadena, Calif., has been made by B. F. DeLanty, acting general manager. The recommendation was made in the eighteenth annual report of the Municipal Light and Power Department recently filed with the city directors by Mr. DeLanty. It was based on the fact that the maximum demand during the year was 11,061 kw. and that the present plant has a maximum capacity of 12,500 kw. and the small reserve plant a capacity of 6,222 kw. only. The 20,000-kw. unit would make necessary the purchase of four 1,000-hp. watertube boilers. It was recommended further that the new plant be so constructed as to use 350-lb. steam pressure instead of 250-lb. pressure as used in the present plant.

According to the report, sales of electrical energy for the year ending June 30, 1925, amounted to $1,306,075.20, an increase of 27.35 per cent over those for 1923-24, which amounted to $1,025,521.95. Undepreciated capital assets as of June 30, 1925, were given as $3,760,268.24.

The gross income for the period was $1,569,809.80. After deducting operating expenses, depreciation and other expenses, there remained a surplus of $376,355.55 for the year, an increase of $79,132.61 over the previous year.

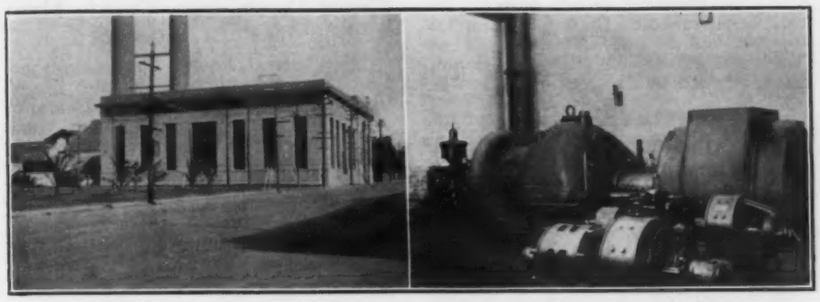
Mr. DeLanty pointed out that in order to compare the results of the year's operation with the results of private corporations of the same character in California it is necessary to deduct taxes which would have been paid if the city plant was that of a private company. The amount which would have been paid as taxes would have been $142,798.08 which, deducted from the surplus, leaves a balance of $233,557.76 for the year.

British Columbia Sends Power to Washington in Shortage

For the first time power was transmitted across the British Columbia-Washington boundary under emergency conditions when connection was made recently between the lines of the Puget Sound Power & Light Company and the British Columbia Electric Railway Company, Ltd. A total of 13,000 kw. was sent south over the interconnected lines from power generated at Stave Falls, B. C. The lack of rain in the Pacific Northwest this fall has created a decided shortage of electric power throughout Washington.

Unprecedented low water in the rivers of western Washington has caused a serious shortage in the city of Tacoma, the municipal light department states. The city is buying power from Seattle over the intertie line, receiving about 100,000 kw-hr. of current daily. Seattle is forced to operate its steam plants in order to supply the current for Tacoma. Tacoma also is buying from several local manufacturing plants and is operating its steam plant to capacity.

Ten-Year License Issued for Alaska Power Project.—A license for ten years has been issued the Buchen and Heinen Packing Company covering a project on Lower Lake on Baronof Island, Alaska.



New power house of the Hawaiian Electric Company (left), the capacity of which has been increased by 12,500 kva., and (right) the new turbo-generator and auxiliaries.

Hawaiian Company Installs New 12,500-kw. Steam Unit

Increasing the capacity of the Hawaiian Electric Company's new power house from 25,000 kw. to 37,500 kw., a third steam-driven generating unit was completed early this last summer. The steam end of the addition includes two 825-hp. Stirling water-tube boilers, a Green economizer, a Cochrane metering feed-water heater and a second reinforced-concrete stack 213 ft. high. The boilers are guaranteed for 200 per cent or normal rating. Each has 8,240 sq.ft. of heating surface. This installation brings the total of these boilers in service at this station to eight. Foundations are in for the additon of two more whenever they become necessary.

The turbine is a Westinghouse, single-flow, 12-stage unit designed for steam at 300 lb. gage and 200 deg. superheat. With the exception of the circulator all of the auxiliaries are arranged with both steam and electric drive. The circulator has only electric motor drive. A Westinghouse condenser of 20,000 sq.ft. cooling surface and equipped with two occluders operates at a vacuum of 27.75 in. at full load. Intake water averages 80 deg.

The generator is rated at 12,500 kva. at 0.8 power factor, 11 kv., 60 cycles, 1,800 r.p.m. On average daily plant operation with an average 24-hour load of 9,000 kw., this new unit has generated as high as 303 kw-hr. net per bbl. of fuel oil. A closed, circulating-type air cooler soon is to be installed to prevent the accumulation of dirt and moisture in the windings of the generator. The generator and switchboard also are Westinghouse.

An increase of 4,000 kw. since 1919 now brings the peak load imposed upon the plant to 15,000 kw. This load includes the lighting and industrial load of Honolulu as well as the plantation pumping load of the island of Oahu. The pumping load of the sugar plantations varies but little over the 24-hour period, and this enables the plant to operate at a high degree of efficiency.

California Wire & Cable Company Buys Plant in Oakland

As a result of the sale of its plant in Oakland to the California Wire & Cable Company, Orange, Calif., the Illinois Wire & Cable Company will retire from the field of wire manufacturing in California.

With factories at Orange and Oakland, Calif., the California Wire & Cable Company feels that it will be in position to render excellent service to purchasers of weatherproof wire on the Pacific Coast. Its Los Angeles office at 1319 Bartlett Building will be continued, with Emmett H. Jones in charge as factory representative. An interesting feature in connection with the business is that the product is essentially Western, the bare wire being purchased from the mills of the Columbia Steel Company at Pittsburg, Calif., which derives the raw product from mines in Montana.

In future all sales of the California Wire & Cable Company's products will be handled exclusively by the Pacific States Electric Company at all of its branches.

Escondido, Calif., to Have Street-Lighting System

Escondido, an agricultural and vineyard city of 2,500 in San Diego County, is to inaugurate its "White Way" within the next ninety days.

Bids were received on Oct. 13, for fifty-three ornamental lighting standards, 16-ft. to light centers, No. 1175 Union metal, with GE Form 12 units, 118 glass. The Globe Electric Company of San Diego was low bidder with a bid of $13,340, the contract being awarded on Oct. 14. These standards will be placed on Grand Avenue from Nutmeg to Juniper; Lime Street from Indiana to Florida; and Kalmia Street from Indiana to Grand Avenue.

This will give Escondido a modern ornamental street-lighting system which, it is felt, may lead to further street lighting in that city.

Hydroelectric Plant to Be Built on Little Spokane River, Wash.—Announcement has been made by Mark F. Mendenhall, president, Mount Spokane Power Company, Deer Park, Wash., that that company will start construction of a new hydroelectric plant early next year. The plant, which will be erected on the Little Spokane River about 35 miles northeast of Spokane, will develop 1,000 hp. and will cost approximately $45,000. The project will be financed principally through local stock sales.

Increase of $2,173,836 in Utility Valuation for Washington.—Assessed valuation of all personal property in the state of Washington belonging to electric light, power, water, gas, telephone, express and other kindred public service companies, for the year 1925 totaled $24,481,510. This is an increase of $2,173,836 over the assessed valuation for the same companies in 1924, which totaled $22,307,674, according to figures just compiled by the state tax commission.

Los Angeles Starts Work on Nine Substations

Work on nine of the twelve new substations to be built for the Los Angeles Bureau of Power and Light began recently. The largest of the group to be built at this time is to be located at Ninth and Mateo Streets. It will have an installed capacity of 65 000 hp. and will replace the two smaller substations now being operated to capacity in that district. The building is to be of reinforced concrete throughout and will cost approximately $400,000.

Other substations to cost $75,000 each will be of steel frame construction. These are to be located at Longwood Avenue and San Vicente Boulevard; Missouri Avenue and One Hundred and Second Street, Sawtelle; Menlo Avenue and Ninety-first Street; Sixth Street and Eleventh Avenue; Clinton and Hoover Streets; one in Lankershim, one in Reseda, and one in Owensmouth.

Suit Threatened in Seattle Joint Pole Disagreement

The Seattle municipal light department and J. D. Ross, superintendent of lighting, are threatened with court action, due to the entanglements of a contract with the Puget Sound Power & Light Company for the use of street poles. For years there has existed between the department and the power company an agreement that wherever either puts up a new pole the other sahll bear the cost of transferring its wires onto it from the old pole, the object being to avoid duplicating pole lines.

The agreement was satisfactory to both parties until a few months ago when the power company started an expansion program in various parts of the city, with the result that Mr. Ross complained that he had neither the men nor the funds to keep up the transferring of city lines. Finally he ordered work stopped, and the power company has complained to Clark R. Jackson, superintendent of public utilities.

Mr. Ross declares that the city was the first to enter many of the outlying districts, "and now that they are built, the company comes along and puts up its poles." The matter has been referred to the judiciary committee of the city council to investigate.

Westinghouse Combines Phoenix and El Paso Offices

The offices of the Westinghouse Electric & Manufacturing Company at El Paso, Texas, and Phoenix, Ariz., have been consolidated under the direction of E. D. Stewart as branch manager of the El Paso office. W. G. Wilson has been appointed local manager at Phoenix.

J. H. Knost, formerly branch manager of the Phoenix office, has been appointed industrial and power sales engineer for the entire Los Angeles district and will be located in the Los Angeles office. R. A. Hopkins, who has been manager of the engineering division, has been appointed central station division manager. J. C. Jones has been appointed assistant manager of the central station division, and will be responsible for the sale of supply apparatus throughout the Los Angeles district.

A.G. Manufacturing Company Has New Home in South Seattle

The new plant of the A. G. Manufacturing Company is in full swing at 303 West Hudson Street, Seattle. Compared to the inadequate and inconvenient quarters previously occupied by the company in the northern part of the city, the new factory building in South Seattle stands out in marked contrast. Transportation and general shipping facilities are better, factory lighting much improved, and the handling of materials during manufacture greatly facilitated. The company produces safety switches of various kinds and "dead front" industrial switchboards, and reference to the accompanying photographs will show that

New South Seattle plant of the A. G. Manufacturing Company.

they think well enough of their own "medicine" to take it themselves. Coincident with the factory expansion comes the appointment of the George A. Gray Company, 910 Howard Street, San Francisco, as California sales representatives.

As to the factory itself, one of the outstanding features is the total absence of the usual motley array of overhead belting in the machine shop. All motors for driving machines—and each machine has its own individual drive—are mounted directly on the machines. Silent chains suitably enclosed in specially designed guards form the mechanical connection between motor and machine. The general interior view of the machine shop shown in the illustration gives an idea of the mechanical arrangements mentioned. It may be noted that each machine motor is controlled by an A-G foot-operated safety switch. Thus for the frequent startings and stoppings of the machines the operator is not required to remove his hands or eyes from the work in hand. The only exception to this is the big press which is controlled by an A-G hand-operated safety switch. The shop is so laid out that raw materials are received at one end and progress through the various stages of manufacture without re-routing and re-handling.

Grays Harbor Utility Property Valuation Hearing Held

Hearing on the valuation of holdings of the Grays Harbor Railway & Light Company of Aberdeen, Wash., recently was held before the state board of equalization at Olympia.

By stipulation between J. E. Calder, Grays Harbor County assessor, and the State Tax Commission, the tax commission assessed the company's entire electrical system as well as its street railway property, placing the combined valuation of both at $1,591.937. At the hearing the company contended that this valuation should be reduced to $1,174,372, which it argued was a fairer valuation. Of this valuation, the company apportioned $233,221 to the street railway system and $941,151 to the light and power system.

Herbert J. Flagg, former chief engineer for the state department of public works and now chief engineer for the Grays Harbor Railway & Light Company, was chief witness for the company at the hearing.

Applies to Commission for Stock Sale Permission

Application has been made by the Southern California Edison Company, Los Angeles, to the California Railroad Commission for permission to sell 100,000 shares of series B 6 per cent preferred stock, face value $10,000,000.

The proceeds of this issue, if authorized, will be used to reimburse the company treasury for capital expenditures heretofore made and to finance the construction, completion and extension of its properties.

Will Re-advertise for Bids.—The Bureau of Reclamation will re-advertise for bids for the construction of the power plant at Yuma. The original bids were in excess of the appropriation available. Sufficient changes have been made in the specifications to bring the work within the limits of the money available, it is believed. The opening of the new bids probably will take place early in December.

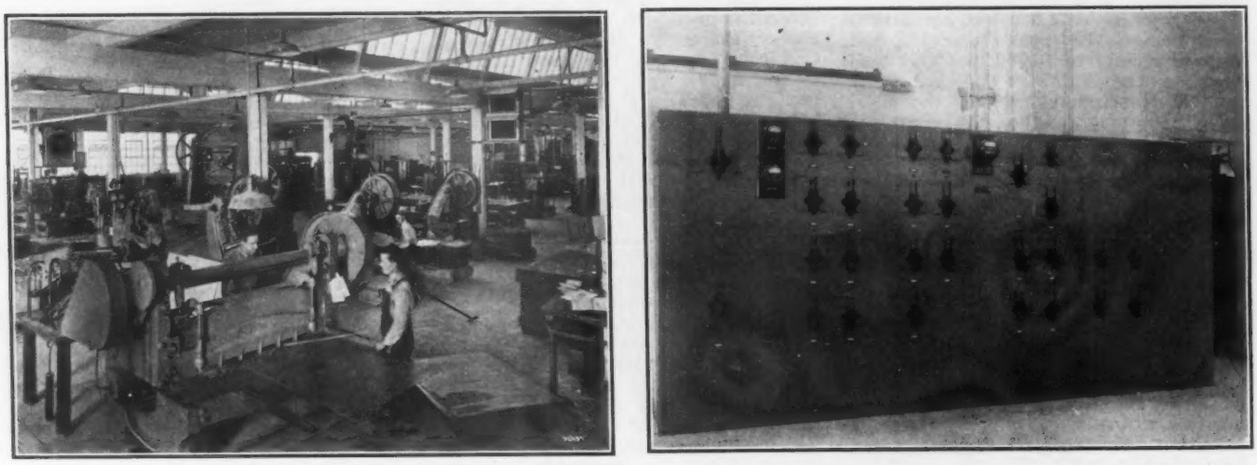
Power Commission Grants Many Western Licenses

The Federal Power Commission authorized the issuance of a joint license to the Feather River Power Company and the Great Western Power Company covering a large project on tributaries of the North Fork of Feather River in Plumas County, Calif. The license is contingent on the securing of the necessary state rights and upon the commission being given the right to have access to all books and records of the companies.

An extension of time has been granted the Snow Mountain Water & Power Company for the completion of its project on the South Fork of Eel River in Lake County, Calif. More time will be required for the completion of the power house at Scott dam to install additional equipment at the Potter Valley power house and to complete the transmission system. It also has been decided to raise Scott dam. The commission has specified a portion of the project which may be completed on or before Jan. 1, 1928, and another portion which must be finished by July 1, 1929.

Reject Wynooche Applications.—The Federal Power Commission has rejected the applications of the City of Aberdeen and the Grays Harbor Railway and Light Company for rights on the Wynooche River on the ground that neither applicant has the requisite state rights and, in addition, on account of the lack of public necessity for the development. Thirty days have been allowed during which the applicants may file an appeal. A report on the status of the Aberdeen project was published in the Journal of Electricity Sept. 15, 1925, p. 225.

Power for Sawmills to Be Developed in Colorado.—James B. Knight, of El Paso, and others have applied to the Federal Power Commission for a preliminary permit covering a project on New River in the Trinity National Forest in Colorado. It is proposed to erect a diversion dam 50 ft. high. The water is to be carried to the power house 12 miles distant through a ditch and a conduit. Some 5,000 hp. of primary power will be made available. The power is to be used for the operation of sawmills.



One of the outstanding features of the new A. G. plant is the complete absence of overhead belts in the machine shop (left), each machine having individual motor drive. At the right is shown the dead-front panel board controlling all of the factory circuits.

Largest Synchronous Condenser Installed at Vaca-Dixon

Recently completed and placed in operation at the Vaca-Dixon substation of the Pacific Gas and Electric Company is the largest synchronous condenser in the world. Installed at the southern terminus of the Pit River 220-kv. transmission system, it will serve to regulate the line voltage so that power from the new Pit 3 power house may be brought down over the existing two transmission lines.

The normal continuous full-load rating of this machine is 40,000 kva. at zero power factor, leading; 3-phase, 60-cycle, 11.5-kv., 600-r.p.m. It was supplied by the Westinghouse Electric & Manufacturing Company. When operating at normal voltage and speed, the condenser will have a normal continuous rating of 25,000 kva. at zero power factor, lagging, provided the field current is reduced to a low value. Operating characteristics of the machine are such that when operating at either of the above ratings the temperature rise of the armature will not exceed 60 deg. C., and that of the field 80 deg. C.

A motor-driven high-pressure oil system provides sufficient pressure at the bearings to float the rotor during the starting period. Forced ventilation is provided by blades carried on the rotor and having a capacity of 80,000 cu.ft. per min. at a velocity of 1,000 ft. per min. Cooling air is conditioned by passing through a Sturtevant air washer.

Starting is accomplished by means of a 3.3-kv., 1,810-hp. motor operating from taps on the transformer secondary; 16,000 kva. is required for starting. The machine is designed to be brought up to full speed in five minutes, during which time the load is applied gradually. The starting motor is capable of driving the machine for 1½ hours as a generator delivering 25,000 kva. at a power factor sufficient to necessitate an external load of 750 kw. during which time the motor temperature will not exceed 50 deg. C.

Second Electric Home at Provo, Utah, Features Moderate House

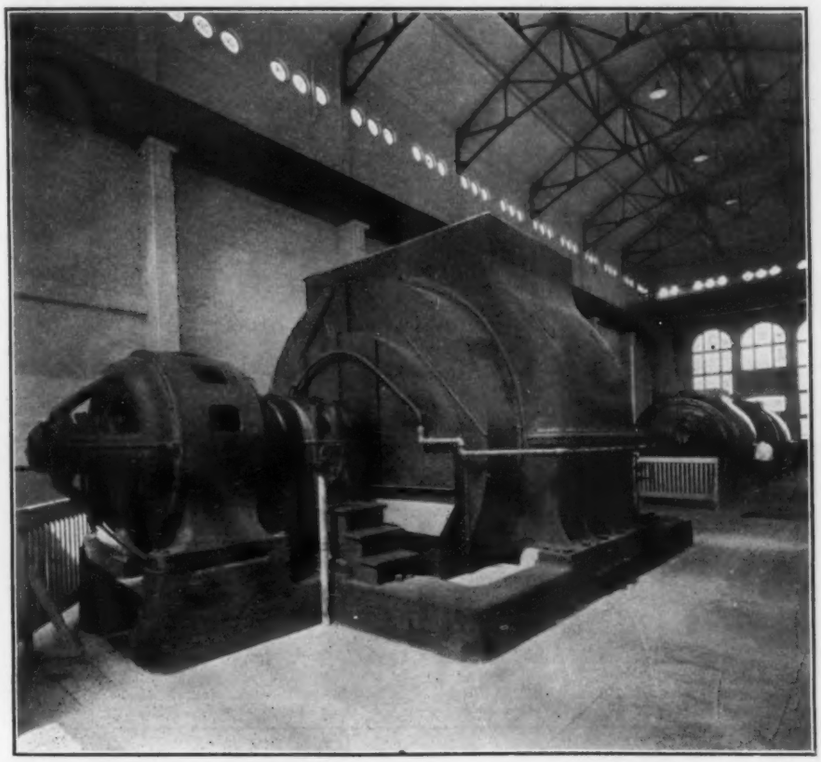
The second electrical home displayed in Provo, Utah, under the direction of the Provo Electrical Contractors and Dealers' Association, was highly successful. One of the important messages conveyed to the public was the fact that a medium-sized house of five or six rooms can be so wired as to allow the efficient use of electrical appliances without spending a large sum of money on the wiring, thus dispelling the idea that an electrically equipped home is a luxury beyond the reach of the ordinary individual.

This home has a total of forty-three electrical outlets, nineteen of which are convenience outlets. As an example of correct illumination and the efficient use of electric labor-saving devices and household comforts, it created much public interest, and was visited by a large number of people.

The various appliances, furniture and floor coverings were provided by electrical dealers and merchants of Provo.

The home, which is a modern six-room house of the colonial type, with a laundry and other rooms finished in the basement, was displayed through the courtesy of the owner, Dr. Stanley M. Clark.

Pittsburgh Railways Awarded Coffin Medal 1925.—The Pittsburgh Railways Company has been awarded the Charles A. Coffin medal and prize for 1925.



New 40,000-kva. synchronous condenser recently installed at Vaca-Dixon substation of the Pacific Gas and Electric Company to provide for additional power from Pit River.

Two Utility Sales Departments Give Get-Together Dinner

A general get-together dinner was given at the Palace Hotel, San Francisco, on the evening of Oct. 17 last under the auspices of the sales departments of the Great Western Power Company and the Pacific Gas and Electric Company. The purpose of this dinner was particularly to emphasize, promote and foster a spirit of co-operation with the trade back of the load-building campaigns now under way in behalf of the two major central stations in northern California.

A special effort was made to have as large a representation of sales people and executives of the so-called non-electrical outlets as possible, including many of the largest department stores in the east bay district.

An interesting educational program was provided. H. E. Sandoval, president of the Sandoval Sales Company, San Francisco, discussed selling electric water heating and air heating for the electric home. Mr. Sandoval was followed by Frank Pollard of the Heeseman Pollard Company, Oakland, his topic being electric domestic refrigeration. The third and last speaker was Ray Turnbull, sales manager of the Northwestern division of the Edison Electric Appliance Company, Inc., who discussed selling the electric range. All of these discussions were educational in their nature, the speakers taking up the economics of their various subjects, the points of sales resistance and successful methods of overcoming them.

The total attendance was about 275. Of this number a considerable proportion consisted of executive and sales people connected with the largest merchandising concerns of the east bay territory.

Mokelumne Power Rights Granted San Francisco Man

The Federal Power Commission recently granted a license to J. W. Preston, Jr., of San Francisco, for a part of a proposed development on the North Fork of Mokelumne River, within the Stanislaus National Forest, in Amador and Calaveras Counties, near the towns of Jackson, Volcano, West Point and Pine Grove, Calif. (Journal of Electricity, Sept. 15, 1925, p. 213.)

The project includes a rock-fill dam approximately 200 ft. high and 960 ft. long, creating a reservoir having a storage capacity of 60,000 acre-ft. at spillway elevation of 3,860 ft. above mean sea level; a water conduit consisting of approximately 89,000 ft. of open ditch, 30,000 ft. of flume, 2,400 ft. of tunnel, and 1,400 ft. of siphon also is included, and will have a capacity of 350 sec.-ft. The approximate total length of this conduit is 25 miles and will lead from the reservoir, designated as "Salt Springs Reservoir" to a power house.

A power house, called "Tiger Creek Power House," is planned where proposed installation will consist of two 17,500-kva. units. Each unit will consist of two horizontal shafts, double overhung impulse wheels of 10,500 hp. capacity driving a 17,500-kva. generator.

The power capacity of the project is estimated as 22,500 hp. and the average static head is 1,247 ft. The power is intended for public utility use.

Injunction Granted to Stop Seattle City Plants From Distributing Outside City Limits

In a suit against the city of Seattle and J. D. Ross, superintendent of lighting, the Puget Sound Power & Light Company has been granted an injunction by Superior Judge Austin E. Griffiths, preventing the city from selling light and power outside its city limits. Approximately 1,400 of the 2,000 out-of-town patrons of the light department, largely north of the city limits, are affected by the decision.

The suit was brought last May when the light department began construction of a line to Renton to serve the Savage Lumber & Manufacturing Company. The line never was completed. The city council disclaimed ever authorizing such an extension, and the corporation counsel issued an opinion in which he called attention to the fact that state law prohibits cities from marketing electric current outside their corporate limits. The city's transmission line from the Cedar Falls generating plant runs through Renton, and it was proposed to supply the Savage company by a connection with that line. Judge Griffiths verbally sustained the company's contention that the city has no right so to distribute and will enter a formal opinion to that effect.

A feature of the case was the refusal of T. J. L. Kennedy, corporation counsel, to appear on behalf of J. D. Ross, who was made a party to the suit, because, he said, he had advised Mr. Ross not to attempt to sell electric current outside the city. The latter, therefore, was represented by his own attorney.

Mr. Kennedy sought dismissal of the action on the ground that the city was in no way to blame for the contract made by Mr. Ross with the lumber company, as the city council never has authorized it by ordinance. The corporation counsel also asserted that Mr. Ross made the installation in Renton with funds appropriated for another purpose, and contended that the action should be against Mr. Ross personally and not against the city. Judge Griffiths, however, refused to see this side of the case. "If the position of the counsel for the city is sound," he said, "then, whenever a suit is brought as the result of an official's act, all the city would have to do to get out of it would be to say 'We did not authorize it by ordinance.' Somebody must be presumed to know of the comings and goings of the city's moneys."

Mr. Kennedy gave notice of a motion for new trial, and in case of denial will appeal to the supreme court as soon as Judge Griffiths' opinion is filed formally. Success of the power company in the Renton case, it is believed at the city hall, means other similar actions which definitely will settle the legality of the city's practice in selling electric current to patrons residing outside the corporate limits.

There is, however, some difference of opinion as to what the effect of such actions might be. Approximately 600 suburban patrons of the light department are being served on contracts made prior to 1915, when the law authorizing the city to sell electric current outside city limits was repealed.

For another class of suburban patrons, and this includes the majority of the 1,400 obtained since 1915, the city delivers the current to a meter at the city limits. The current goes into the meter on the city side and is taken out the other side by the patron who lives over the line. It is believed that the power company plans to bring some test cases to settle definitely what view the courts might take of the latter class of patrons.

A clear-cut victory for the power company, it is pointed out, would not necessarily mean that action would be brought to require the city immediately to relinquish all outside business, as most of the out-of-town patrons are in districts not served by the power company at the present time. The power company, through A. W. Leonard, president, has assured city officials that the decision in the Savage Lumber Company case will not result in any attempt to prevent the city's furnishing electric power to complete the Lake Youngs tunnel contract, a municipal project. Mr. Leonard pointed out the difference in principle between selling electric power to a private concern outside the city limits, for which the city is claimed to have no authority, and furnishing current to a contractor on an important municipal project. Mr. Leonard charged that the superintendent of lighting was taking advantage of a situation to "stir up public resentment against a decision which merely prevented the city from engaging in a purely private business outside its corporate limits."

Pacific Coast Steel Pictures Win Salon Honors

Two photographs taken by R. J. Waters under the direction of C. H. Tallant, advertising manager of the Pacific Coast Steel Company, San Francisco, won salon honors in recent photographic exhibitions held in San Francisco.

A photograph taken in the Pacific Coast Steel Company's factory at South San Francisco, reproduced herein, was awarded first salon honors for industrial photography at the exhibit of the Photographers' Association of America.

The photograph, also reproduced on this page, of one of the steel towers on the Pit River line of the Pacific Gas and Electric Company, was awarded first salon honors for 1925, in commercial photography, at the exhibition of the Pacific International Photographers Association.

Both of these photographs were used in advertisements printed as front covers for the Journal of Electricity.

School Held for Range Salesmen of Department Stores

Salesmen in department, furniture anl hardware stores selling ranges and heavy-duty appliances were given an opportunity to learn more about this equipment in a school which was held in San Francisco recently.

Classes were held Tuesday and Thursday nights over a period of four weeks. The names of those who enrolled were listed and the company employing them was notified of their attendance at each meeting of the class. The course consisted of four lectures on electric ranges, two on water heaters and two on air heaters.

The school was given under the auspices of the Great Western Power Company and the Pacific Gas and Electric Company, with the classes being held in the building of the latter company at 447 Sutter Street. The instruction was given by J. W. Wrenn, assistant sales manager of the Great Western Power Company, and E. M. Marsh, range sales supervisor of the San Francisco district of the Pacific Gas and Electric Company.

Tacoma Man Buys Sherman County, Wash., Company.—The assets of the Sherman County Light & Water Company in Lewis County, Wash., have been sold at a sheriff's sale to H. H. Cleland of Tacoma, for $35,000. The assets include a pole line from Chehalis to Centralia and a franchise to supply Centralia and Chehalis with lights.

Winners of first salon honors in recent photographic exhibitions. Left: A steel tower on the Pit River line that won first salon honors for commercial photography at the P. I. P. A. exhibit. Right: Interior of Pacific Coast Steel Company plant that won first honors in industrial photography at the P. A. A. exhibit.

Series of Bulletins to Cover Industrial Paint Problems

As a contribution to literature relative to the use of paint in industry W. P. Fuller & Company, San Francisco, are preparing a series of industrial paint bulletins. It is the object to cover in these bulletins all of the important paint problems and many of the lesser ones that arise in industries of all kinds.

Several of the subjects of the bulletins are of particular interest to the electric light and power industry. Following is a partial list of these:

Painting of Engine and Boiler Rooms and Equipment.

Painting Maintenance of Interior Walls and Ceilings of Industrial Plants.

Damp-proofing of Concrete, Brick, Masonry, etc.

Painting Felt and Metal Roofs.

Painting of Industrial Automotive Equipment.

Interior Painting of Power Houses, Substations, and Pumping Stations.

Painting Electric Transmission Lines.

Painting Specifications for Industrial Employees' Homes.

It is the plan of the Fuller company to have the bulletins comprise a reference work on the subject of industrial paints.

Portland Utility Buys Property at St. Helens, Ore.

Acquiring the distribution system and franchise rights of the St. Helens Light & Power Company, St. Helens, Ore., the Portland Electric Power Company, Portland, has added a district containing some 650 customers to its system. Confirmation of this purchase was given out recently following the action of the city council of St. Helens in approving the transfer of the franchase privileges to the purchasing company.

For the time being all the energy needed in the new district will continue to be supplied from the plant of the St. Helens Lumber Company, from which the old operating company purchased power. The plans of the Portland company, however, contemplate the extension of its transmission line from Scappoose to St. Helens, a distance of seven and a half miles, to connect the new district to its own lines. Clyde H. Thayer, formerly in the commercial department of the Portland Electric Power Company, at its St. Johns office, has been appointed resident agent of the new district.

Electrically Welded Pipe Saves Oakland Project $4,000,000

Eighty-five miles of electrically welded steel pipe to be made by the Steel Tank & Pipe Company of Berkeley, Calif., is provided for in the contracts for the Mokelumne River water supply project of the East Bay Municipal Utility District, Oakland, Calif., which have just been let by the district's directors. Of the $11,751,427 contracts let, $10,444,985 has been awarded to Twohy Brothers Company for the pipe lines. The balance is for the construction of a tunnel and pump house.

In the matter of selecting electrically welded pipe, in which the diameters will vary from 60 to 65 in. and heads will range up to 380 ft., the district's board of engineers states:

"The welding of pipe by electric methods is a comparatively new art, particularly for such heavy pipe as required by this aqueduct, and your board has given careful and special consideration to the dependability of this product. Samples of the work have been submitted that show beyond question the possibility of securing a welded joint by this method having 100 per cent efficiency, and the tests required are ample to secure the required efficiency on every joint. Aside from these tests the work is guaranteed by the association of large manufacturers of the highest standing and long experience, and by a heavy bond to guarantee its proper execution. We, therefore, have no hesitation in recommending the acceptance of this method of manufacture, which will save the district more than $4,000,000 over prices that could be obtained for any other method."

Puget Sound Company Extensions and Improvements Numerous

The Puget Sound Power & Light Company, Seattle, recently started construction of a new power line on the Olympic Highway between Montesano and Elma, which gives a direct route to Elma, and also enables about 30 families between Montesano and Brady to have electric service. The line will cost $17,000 and will be of 11-kv. construction.

The company also has started survey work for extension of electric power lines across Deception Pass and down the center of Whidby Island. Franchises for the use of highways of Island County and in the town of Oak Harbor are being secured by the company. Deception Pass will be spanned by a cable carrying the wires, suspended by steel towers on either side of the pass, the wires being 120 ft. above the surges of the pass.

The power company also recently finished the complete rebuilding of the light and power distribution system of Concrete, Wash., at a cost of $10,000. The street lighting system has been improved with new standards, and lines have been extended to every street in the city. The company has "cut in" the new substation in Kelso, Wash., and the system there has been placed in service. A new concrete building will be erected immediately.

L. A. Electric Club Bowling League Is Organized

A bowling league, in which twenty-four teams will represent the numerous electrical interests of Los Angeles, was launched at a luncheon meeting called recently in that city for the purpose of organizing an Electric Club Bowling League. J. A. Sines, southern California representative of the Chicago Fuse Manufacturing Company, was elected president and treasurer of the newly formed league, and A. O. Marston, executive secretary of the Electric Club, was named secretary.

Lake Almanor Tunnel Finished.—The tunnel which is to convey water from Lake Almanor to the power-house site, finished recently, will enable the contractors who are raising the dam at this lake for the Great Western Power Company to fill in the dam to its required increased height. The dam is to be raised 46 ft. higher than its former level.

Edison Company Sets Record in Stock Selling Campaign

Selling $16,423,200 of company stock to 7,816 stockholders during the first seven months of 1925 is the enviable record established by the Southern California Edison Company in its effort to advance the customer-ownership idea. During the corresponding period of 1924, $12,924,900 worth of stock was sold to 4,563 stockholders. The 1925 period thus shows an increase in money received of 27.07 per cent and a 71.29 per cent increase in the number of stockholders secured.

Early in 1917 the customer-ownership campaign was launched by the company. At that time there were 2,207 stockholders all told. On July 31, 1925, there were 78,053, showing an average yearly increase in stockholders of 9,480. Of the total number of stockholders more than 90 per cent reside in the territory of southern and central California served by the company and are customer partners, and more than 90 per cent of the individuals comprising the company's operating and construction organization are employee partners.

The largest stockholder of the company owns less than 2 per cent of the total capital stock outstanding, and the sum of the holdings of all stockholders holding $100,000 or more is less than 15 per cent of the total. More than 75 per cent of the total outstanding stock is owned by over 78,000 stockholders in small holdings of from $100 to $10,000. Dividends to the amount of $31,388,279.90 had been distributed to the stockholders of the company up to July 31, 1925.

A.I.E.E. News

Los Angeles Section will hold its next regular meeting Nov. 3, at 6:30 p.m. in the banquet room of the L. A. Creamery Company, Eleventh and Towne Avenue. The program will include dinner, after which R. W. Sorensen, professor of electrical engineering at California Institute of Technology, will speak on "Scientific Education." Louis Degen, consulting engineer, and R. H. Manahan, city electrician, will speak on the "Evolution of the Fire Alarm System." Following the discussions, an inspection trip will be made to the new central fire alarm station at 2220 West Sixth Street.

Proceedings of Paris International Conference on High-Tension Lines.—If there is sufficient demand, it is planned to publish in English two 1,100-page volumes containing the papers presented at this conference. It is especially desirable that this publication be made, according to P. F. Rowell, secretary of The Institute of Electrical Engineers (England). However, it will be impractical to publish the volumes unless there is sufficient demand, and American engineers interested are requested to communicate at once with A.I.E.E. headquarters. If the demand reaches 800 copies the price will be about $12, and if 400 copies are subscribed for the price will be about $20.

Pacific Coast Electrical Association

Sales Promotion Work Will Feature Commercial Section's Activity This Year

Sales, rather than study, were set forth as the objective of the various committees of the Commercial Section, P.C.E.A., at the meeting of the executive committee of that section, Oct. 23, at the office of H. M. Crawford, section chairman, Pacific Gas and Electric Company, San Francisco. In arriving at budget requirements, Mr. Crawford asked for an outline of the work proposed to be done by each committee for the year.

Although some research work is to be attempted, particularly in the electric refrigerator and electric-range and water-heater fields, the major effort of the section for the year will be commercial. Active participation in sales effort, notably in electric truck sales, industrial heating sales, range and water heater sales, appliance sales, and lighting sales, will be fostered by the section, it was brought out in the plans outlined by the committee chairmen or their representatives present at the meeting.

The meeting was opened with a discussion of the Industrial Lighting Activity now being started as part of the national campaign of the N.E.L.A. Clark Baker, chairman of the lighting committee of the Commercial Section, being absent, a report on the Industrial Lighting Activity was asked of A. M. Frost, geographic chairman, Pacific Coast division of the activity.

Mr. Frost described briefly the plan being worked in the division for industrial lighting promotion, and spoke of the organization he has completed for the campaign. G. H. P. Dellmann, Frank Weiss, and Charles Masson, were announced as the vice-chairmen in charge of the activity in the southern part of the state, and C. D. Montieth, H. H. Allison, and H. K. Griffin in charge of northern activity.

Inasmuch as the effort of the electric truck and transportation committee last year was concentrated on the selling of electric transportation to the power companies themselves, the activities of that committee this year, H. H. Singletary, chairman, declared, will be devoted to sales of trucks to commercial customers.

Speaking for P. P. Pine, committee chairman of the electric heating and cooking committee, E. F. Perkins, vice-chairman of the committee, announced the purpose of the committee as more for commercial work than for research this year. The range surveys being conducted by the Northwestern Division, N.E.L.A., are scheduled to be completed early next spring, and instruments being used in that work are to be released at that time. It was felt, however, that the instruments could not be received here in time to conduct for a long enough period the survey contemplated in California to be able to report results at the annual convention of the Pacific Coast Electrical Association next June. Although the survey work is to be started as soon as possible, major effort of the committee this year is not to be devoted to this problem.

The electric heating and cooking committee, however, is to make an analysis of the growth of range and water-heater sales, and of the sales policies used, and is to make a determination of which policies are best.

Considerable discussion resulted from the suggestion that some standardization be sought in the matter of the switch apparatus required in various localities in connection with electric ranges and water heaters. Mr. Frost advocated a liaison with the Technical Section of the Association to bring to its attention the necessity for a consideration of the commercial aspects of installation requirements.

Frank Boyd, as chairman of the power committee of the Section, outlined the plans for his committee's work as the concentration of effort to promote industrial heating installations. Commending the work of the Committee on the Relation of Electricity to Agriculture, and saying that no work of his committee could do more than duplicate the fine work being done in agricultural power development by this agency, Mr. Boyd said that he had decided that a concentration on industrial heating was a logical step. His plan contemplates the issuance of a small bulletin setting forth the electrical industrial heating applications in the West, as a medium of promoting a development of that business. A slide lecture on industrial heating applications also is planned for use by power company representatives in sales talks or talks before business organizations.

In outlining the work necessary in the appliance committee, J. W. Wrenn, chairman of the committee, promised an intensive appliance sales effort. The booklet issued by the California Electrical Bureau was commended and advocated as an excellent piece of printed matter to use in connection with appliance work. H. C. Rice, of the Southern California Edison Company, Los Angeles, described successful co-operation between power company and the Electragists of Los Angeles in conducting thirty-day specials on some predetermined appliance, each dealer or power company making his or its own special, but tying in with the general advertising effort put forth for the sale of that appliance that month.

Electric refrigeration, as a desirable load-builder and one of the best appliances for sale on lighting circuits, was held out to the appliance committee as a subject for special consideration.

Lloyd Henley, chairman of the customer service committee, called on H. K. Griffin, chairman of that committee last year, for an expression of an opinion as to work that his committee would have wished to see carried on. The preparation of the manuals by that committee last year were complimented highly by the individual members of the executive committee. Mr. Griffin suggested that there was a field open for the application of the manual in many localities, and spoke of the probability that questions of importance to be considered by this committee would come forth in number in the first meeting of the committee. It was suggested, too, that the manual be expanded to cover other conditions than those treated in a general way in it.

The next meeting of the Commercial Section, a meeting of the entire section, was scheduled for Nov. 19-20, in San Francisco.

Accident Prevention Committee Subjects Assigned

Better to crystallize the activities of the members of this committee as well as the committee as a whole, definite subjects have been assigned to each of the members of the committee for study during the year. A list of the subjects and those to whom they were assigned is given below:

"Accident Statistics," G. W. Lyons, Great Western Power Company, San Francisco.

"Apparatus and Devices," P. B. Garrett, Westinghouse Electric & Manufacturing Company, San Francisco.

"Identification of Cables," P. F. Melnick, Los Angeles Gas & Electric Corporation, Los Angeles.

"Lighting," G. C. Rucker, Holophane Glass Company, San Francisco.

"Safe Practices," M. S. Slaughter, The Southern Sierras Power Company, Riverside, Calif., and W. L. Smith, Los Angeles Bureau of Power and Light.

"Safety Bulletins," F. V. Wright, The Southern Sierras Power Company, Riverside.

"Safety Code," S. C. Dickenson and C. A. Jordan, Pacific Gas and Electric Company, San Francisco.

"Safety Instruction Courses," L. L. Dyer, S. C. Haver and D. J. Kennelly, Southern California Edison Company, Los Angeles.

"The Foreman," W. E. Richmond and E. D. Sherwin, San Diego Consolidated Gas & Electric Company, San Diego.

"Tools," S. M. Bullis, California Oregon Power Company, Medford, Ore.

N.E.L.A. Selects Atlantic City for Next Convention

The forty-ninth convention of the National Electric Light Association will be held on Young's Million-Dollar Pier, Atlantic City, May 17-21, 1926, inclusive. Contracts have been signed and general plans for the convention completed.

A manufacturers' exhibition will be held in connection with the convention. The exhibit will be on the Million-Dollar Pier, as in previous years, and it is anticipated that more space than ever before will be devoted to the exhibits. The exhibition committee is now at work on floor space plans and general arrangements and will be prepared to make definite announcements in the near future.

News of the Electragists

California Electragists Discuss Trade Policy and Business Problems

Trade policy, electrical merchandising by contractor-dealers, and financial and business problems confronting the members of this branch of the industry, were the three major topics discussed at the second quarterly meeting of the California Electragists, Southern Division, which was held at Lebec, Oct. 16-17.

C. J. (Cy) Geisbush and W. F. (Bill) Brainerd (the caddy) snapped as they returned from the golf links. The success of the convention of the California Electragists, Southern Division, which was held at Lebec, was due largely to their efforts.

A members' meeting was held Friday evening, Oct. 16, with Harry Walker, president of the California Electragists, presiding. He stated the members' meeting was the first on the program following a precedent established at Eureka at the annual meeting of the Northern Division.

C. J. Geisbush, executive secretary, reported on his attendance at the meeting of the Association of Electragists, International, which was held at West Baden, Ind. He emphasized the report of the trade policy committee and its effect upon every member of the Association. The California Electragists, Southern Division, went on record as endorsing the trade policy as adopted by the A.E.I.; that is, that distribution of electrical supplies shall be from manufacturer to jobber to contractor-dealer to consumer.

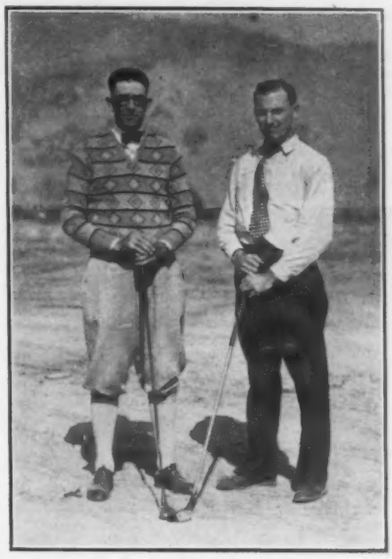
Merchandising Section

The merchandising section held its meeting Saturday morning. O. N. Robertson, Santa Ana, called the meeting to order. This session was attended by over 100. This was the first business session of the electragists that was attended by women, and fourteen took advantage of the opportunity to be present. The Southern Division has taken the lead in asking the women to take an active part in its meetings.

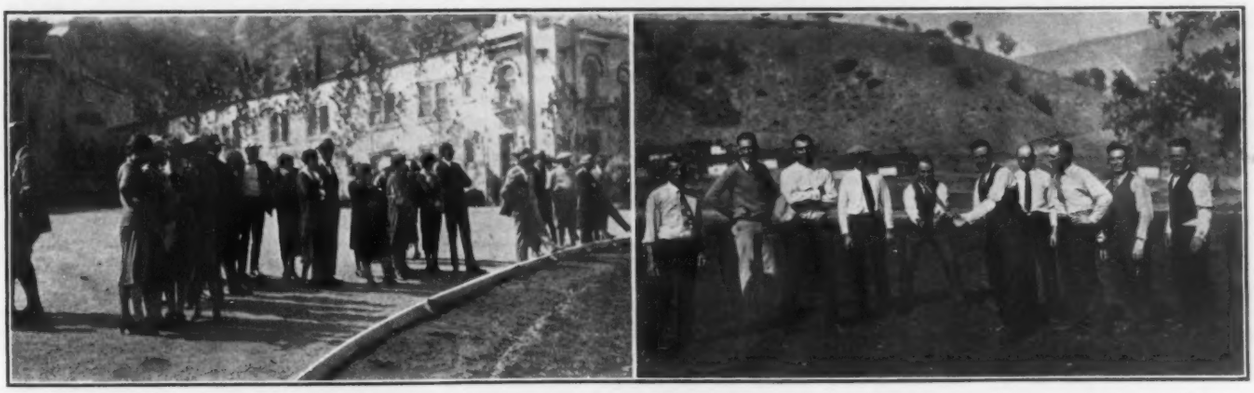
Electrical merchandising from the standpoint of the contractor-dealer was the subject of the report of a special committee appointed at the San Diego meeting of the organization. The committee concentrated its efforts on the effect of the marketing of electrical merchandise by the central station. The report stated that the central station branch of the industry is going to sell electrical merchandise, and on a scale never before attempted; that for the most part their programs contemplate a close tie-in with the retail dealer; and that the whole industry recognizes the fact that if the contractor-dealer is to play the part expected of him he must be assured a net profit on his transaction. The report presented a very comprehensive picture of the merchandising problems before the industry. In order that a larger number may read this report, it is published on another page of this issue.

H. C. Rice, appliance sales agent of the Southern California Edison Company, outlined the proposed merchandising activities of that company during 1926. He stated monthly specials would be featured, using one particular appliance during each month; these programs will be planned three months in advance so that the dealers will be able to prepare to tie-in with these specials. Mr. Rice said that dodgers would be sent to all of their consumers with their bills calling attention to these specials and also stating that the appliances featured could be purchased at other electrical dealers' stores at the same price.

A. M. Frost, sales manager of the San Joaquin Light & Power Corporation, urged that a committee be appointed to act as a contact point with the central stations. He also suggested that this committee meet with all of the central stations in California and endeavor to have them adopt uniform merchandising plans. Mr. Frost suggested that grievances against the central station companies should be taken up with the company involved so that they might be adjusted. He



R. F. Doll (right) of Glendale won the golf driving contest; and M. T. Dacus, Ontario, was second. Mr. Dacus was the winner in the golf tournament.



An interested group of "fans" who watched the baseball game between the electragists and the jobbers and manufacturers, and the electragists' team which was victorious.

said business must be profitable for the dealer in any merchandising program.

Education of the individual branches of the industry was discussed by D. C. Pence, manager of the illuminating department of the Illinois Electric Company.

The following permanent executive committee of the merchandising section was appointed by H. H. Walker: C. A. Rowley, Pasadena; O. N. Robertson, Santa Ana; D. D. MacFarlane, Los Angeles; E. F. Gielow, Anaheim; and A. M. Fitch, Pomona.

In a baseball game following the meeting, the electragists defeated the jobbers and manufacturers.

General Open Meeting

"Know Your Business" was the title of a business guide prepared by the electrical supply jobbers of Los Angeles that was presented at the general open meeting held in the afternoon. The subject was treated under three major heads: the business within itself; the business in its relation with a bank; and the business in its relation with the jobber. All of these subjects were given detailed treatment.

Topics treated under the first head included: organization, overhead, capital, accounting, method of handling all

O. N. Robertson, chairman of the merchandising section of the California Electragists, Southern Division, and A. M. (Jack) Frost, sales manager of the San Joaquin Light & Power Corporation, spent a great deal of time together at the Lebec meeting of the electragists discussing merchandising problems.

classes of sales, lien rights, costs, financial statement, credit extension, collection of accounts receivable, relation of turnover to net return, merchandise investment, proper purchasing, and cash discount.

Charts and diagrams were used to present more clearly certain phases of the work. Various members of the organization stated the whole treatise was one of the most complete, interesting and constructive papers that ever has been presented to a contractor-dealer organization. The report was received so enthusiastically that the jobbers decided to publish it in its entirety as a textbook for electragists.

Another members' meeting was held following the open meeting. Trade policy was again the major topic of discussion, and reports were received from men from various districts upon conditions that existed in their particular localities.

Ladies not attending the afternoon meeting played bridge and five-hundred. Handsome prizes for the winners were awarded in the evening at the banquet, which was followed by dancing.

Contractors Hear Addresses on Proper Industrial Lighting

Contractors in the San Joaquin Valley of California from Merced to Taft, were told the story of proper industrial lighting at a meeting in Fresno on Oct. 14 and one in Bakersfield on Oct. 15. The Fresno meeting was held in the San Joaquin Power Building and in the carbarn auditorium in Bakersfield.

A. M. Frost, Pacific Coast geographic chairman of the industrial lighting committee of the N.E.L.A., called the meeting to order. He spoke of the industrial lighting activity as an aftermath of the Home Lighting Contest which produced such satisfactory results. Mr. Frost then explained the work of the various committees and the fields to be reached as including all lighting not considered as home lighting and store lighting. This will embrace garages, machine shops, factories and similar places.

Leo Giannini of the Edison Lamp Works of the General Electric Company was then introduced by Mr. Frost. Mr. Giannini gave a most interesting and instructive talk on the laying out of shop illumination. He illustrated the elementary principles of light and reflection and the meaning of a foot candle of illumination.

Four fundamentals of proper lighting as given by Mr. Giannini are: 1. Sufficient light; 2. Freedom from glare; 3. Proper distribution—freedom from dark spots, and uniformity; 4. Simplicity.

He expressed the opinion that the ideal unit to be recommended for most shop practice was the R.L.M. standard dome reflectors with a bowl enamel Mazda C lamp.

The meeting room next was considered as a shop, and a proper lighting layout was made. Pamphlets were distributed that gave all the tables necessary to do this work, and each step was followed closely by those present.

Several other typical layouts were made. The men in attendance were given sufficient information to enable them to design an industrial lighting job which would produce satisfactory illumination.

Thirty-four of the seventy people in attendance at the Fresno meeting were contractors. Ten of the twenty-two present at Bakersfield were contractors from Bakersfield and Taft.

The Standard Electric Company, Van Nuys, Calif., has opened a new store on Sylvan Street.

The G. & L. Electric Company of Beverly Hills, Calif., has moved into a larger and better store on Canon Drive.

The Model Electric Company of Compton, Calif., recently moved into a larger store. **A. C. Nygaard** is the proprietor.

C. E. Stanley, formerly at 511 East Channel Street, Stockton, has moved to a new location at E. Miner and Wilson Way in that city.

T. P. Mosso, who was forced to retire from active business on account of ill health, again has entered the electrical contracting business in Los Angeles.

Max Rosenthal, head of the electric contracting firm of Williams & Rose in Denver, has joined with a Denver group in the leasing of valuable downtown property for the possible erection of a large hotel building.

C. J. Geisbush, executive secretary of the California Electragists, Southern Division, has returned from the convention of the Electragists, International, at West Baden, Ind.

George L. Black, formerly manager of the **Field Electrical Company,** San Bernardino, Calif., recently has entered business for himself as an electrical contractor and engineer in that city.

D. L. Davis of the Davis Electric Company, Ontario, Calif., has opened the D. and E. Electric Shop in Uplands. **Beatty Eason** has charge of the contracting and retailing business of this branch.

E. G. Sheibley, chief engineer and assistant superintendent of the Industrial Accident Commission, recently addressed the Los Angeles Electrical Contractors and Dealers' Association on the new State Code.

C. F. Butte, Edward Martin, Victor Lemoge, and **E. E. Browne,** all of San Francisco, and **H. H. Courtright** of Fresno were in Los Angeles recently attending a meeting of the state executive committee of the California Electragists.

Fred Ayres has recently joined the H. H. Walker organization in Los Angeles as merchandising and advertising manager. Mr. Ayres has been connected with the Bullock Department Store in a similar capacity for the last five years.

S. F. Jones has acquired complete ownership in the firm of **Winder & Jones,** electragists of Covina, Calif., with branches at Azusa and Glendora, upon the retirement of **R. B. Winder.** The business will continue to be operated under the same firm name.

Bakersfield Contractors Discuss Industrial Illumination.—Industrial illumination as it affects the contractor-dealer was the subject at a recent meeting of the Electric Contractors' Security Alliance of Bakersfield, Calif. D. C. Pence, manager of the illuminating department of the Illinois Electric Company, Los Angeles, addressed the meeting.

A. A. Leithold has sold the **Glendora Electric Company,** 121 N. Michigan Avenue, Glendora, Calif., to **J. N. Searles,** an engineer from Mazetta, Minn. Mr. Searles is remodeling the entire interior of the store so that the electrical, radio, and fixture departments will be separated. A special art goods department will be installed and managed by Mrs. Searles.

Contractors Sponsor Dinner Dance.—San Francisco electrical contractors sponsored a semi-annual get-together party of the electrical industry of that city Oct. 10. Redwood Lodge in Marquard's restaurant was reserved for the dinner dance which was enjoyed by 140. Three gate prizes were awarded during the evening. Charles Shipman, David Carlson, Charles Lyman and Ed Dowd were in charge of the arrangements.

All-Metal Standard of Wiring May Be Enforced in Denver Suburb.—The all-metal standard for electrical wiring which is required in Denver will be required in Englewood, Colo., if a planned campaign of annexation to Denver is successful. In the meantime, the electrical ordinance which was introduced early in the spring has been abandoned and return made to the old regulations permitting knob-and-tube installations with only nominal inspection.

Meetings

Highway Lighting Held Solution of Headlight Problem

That the difficult problem of regulating automobile lighting on highways must be solved eventually by the only sensible method possible, namely, better highway illumination, was one of the many ideas presented by Louis F. Leury, consulting electrical engineer and president of the San Francisco chapter of the A.I.E.E., at a recent meeting of the San Francisco chapter of the Illuminating Engineering Society, to which members of the A.I.E.E. were invited. Mr. Leury spoke of the relation of the electrical engineer to illuminating engineering.

The meeting also was addressed briefly by A. W. Copeley, general engineer for the Western offices of the Westinghouse Electric & Manufacturing Company, and member of the executive committee of the A.I.E.E.

Sketching a "picture of the field," as he said, Mr. Leury detailed the opportunities for co-operation between electrical aand illuminating engineers with particular reference to the Pacific Coast. He pointed out the possibilities for development of electric illumination in the industrial, commercial and residential fields of the West, and declared the field was wide open for such work. Another of the high points of his address was his advocacy of the retention of electrical engineers by commercial and industrial organizations, in order that electrical installations, such as good lighting installations, might be saved from the disaster of going to rack and ruin for lack of attention and of a continuity of policy which would keep them up to date.

Women Organize in Northwest and Schedule First Meeting

Setting the time and place of the first meeting of the Women's Committee of the Public Relations Section of the Northwest Electric Light and Power Association as Oct. 23, 1925, at Salt Lake City, Mrs. L. A. McArthur, wife of the vice-president and general manager of the Pacific Power & Light Company, Portland, chairman of the committee, announced plans of organization and activity among the women of the electrical industry in the Northwest that promise to assist materially in the public relations work carried on by the various companies. It was expected that prior to this meeting a number of sectional committees would have been formed by the women in the different company organizations in the territory so that each company representative might bring to the general meeting ideas from which would be co-ordinated the work of the general committee for the year.

The scheme of organization has been to place upon the association committee one or more representatives from each of the member companies, these representatives to act as chairmen of women's committees formed in their own companies. A large number thus are enlisted, and machinery is provided to carry out plans and activities formulated and suggested by the association committee. Two innovations have been injected into the formation of this committee: a special effort has been made to interest the wives of men employees, and a women's committee from among the jobbers and manufacturers is to be included on an equal basis with those of the power companies.

The personnel of the committee, besides the chairman, is as follows: Eva Osborne, Utah Power & Light Company, Salt Lake City; Mrs. Nina J. Johns, Idaho Power Company, Boise; Nelle Duffey, Puget Sound Power & Light Company, central district, Seattle; Bertie Neil, Puget Sound Power & Power Company, southern district, Vancouver, Wash.; Mary K. Walsh, The Washington Water Power Company, Spokane; Mrs. Perry Crawford, The California Oregon Power Company, Medford, Ore.; Marguerite Butler, Portland Electric Power Company, Portland; Mrs. D. Southwick, Pacific Power & Light Company, Portland; Ellen McCurdy, Pacific Power & Light Company, Walla Walla, Wash.; Hilah Brick, Bend Water, Light & Power Company, Bend, Ore.; Miss Dorgan, Mountain States Power Company, Albany, Ore.; Mrs. E. G. Robinson, Molalla Electric Company, Aurora, Ore.; Anna Gyllenberg, Eastern Oregon Light & Power Company, Baker, Ore.; Mrs. A. W. Angell, Northwestern Electric Company, Portland; Esther Miller, Grays Harbor Railway & Light Company, Aberdeen, Wash.; Edna Comstock, Oregon Public Utilities Information Committee, Portland; and Clara Redheffer, General Electric Company, Portland.

COMING EVENTS

Publicity Section, Pacific Coast Electrical Association—
Palace Hotel, San Francisco,
Nov. 19, 1925

Executive Committee, Pacific Cost Electrical Association—
Office of the Secretary, San Francisco,
Nov. 20, 1925

Commercial Section, Pacific Coast Electrical Association—
San Francisco,
Nov. 19-20, 1925

California Electrical Bureau—
Executive Committee Meeting, San Francisco
Nov. 19, 1925

Fourth National Radio Conference—
Washington, D. C.,
Nov. 9, 1925

National Association of Railroad and Utilities Commissioners—
Kansas City, Baltimore Hotel
Feb. 9-12, 1926

Electrical Bureau Fills Board Vacancies

To fill the vacancies in the advisory committee of the California Electrical Bureau, a special meeting of that committee was called to order by C. E. Heise, following the meeting of the San Francisco Electrical Development League, Oct. 12.

P. H. Booth, president of the Edison Electrical Appliance Company, Inc., Los Angeles, was appointed to fill the vacancy made by the retirement of H. B. Squires from the committee; and to fill the vacancy made by the advancement of P. H. Booth, already a member of the committee, H. E. Sandoval, president of the Sandoval Sales Company, San Francisco, was named.

Book Reviews

HENDRICKS COMMERCIAL REGISTER

(Thirty-third edition.)

Hendricks Commercial Register, 70 Fifth Avenue, New York, and 18 East Huron Street, Chicago. $12.

The claim that this directory of business establishments is the most complete in existence is well justified in the most recent edition, the thirty-third, brought out by the publishers recently. Its particular feature is the elaborate and complete cross-indexing, making for the greatest facility possible in the finding of information contained in it.

This particular register enjoys a unique position in business reference media in that it physically manifests the results of almost thirty-five years of painstaking endeavor. The register, nevertheless, makes use of the modern methods of classification. It serves as an excellent guide to industrial concerns who wish to purchase materials or machinery in the most efficient and economical way.

Although a large volume, it is arranged typographically so as to contain the maximum in information in convenient form. It is a most complete directory of the products of American manufacture, and should enjoy a well deserved prestige among men who buy or specify. Manufacturing and jobbing establishments, as well as contractors, architects and engineers should derive much value from the possession of the latest edition of the register for immediate reference.

NATIONAL DIRECTORY OF COMMODITY SPECIFICATIONS

Department of Commerce, Bureau of Standards, George K. Burgess, Director. 379 pages. Cloth bound. Listed as Miscellaneous Publications No. 65. August, 1925. $1.25. Sold only by Superintendent of Documents, Government Printing Office, Washington, D. C.

This authentic publication is designed to further the economy which can be realized in the purchase of commodities by the use of specifications. Real competitive bidding and the delivery of satisfactory material may be insisted upon through the wide use of definite specifications. Information regarding the best-known specifications for more than 6,000 commodities is given in convenient form in this directory. Specifications in general use are given, by whom these were prepared and where copies may be obtained. There is also an alphabetical list of commodities.

Census of Electrical Industries Published.—The Bureau of Census of the U. S. Department of Commerce has published the 1922 report on central electric light and power stations. The report is published quinquennially, the first one covering the year 1902. Among other subjects the report covers: Summary for the Industry; Development of Hydroelectric Power; Primary Power Equipment; Generating and Subsidiary Equipment; Transmission Lines and Output; Financial Statistics, and Employees, Salaries and Wages.

Personals

F. R. Jamison, former Texas newspaper publisher, recently has been appointed director of publicity for the Public Service Company of Colorado, Denver. In this position he will combine and supervise the publicity and advertising activities throughout the various districts in the state of Colorado and Wyoming where the company's interests are located. Mr. Jamison for several years was engaged in the newspaper business in Texas, having owned and published for some time the Canadian Record, at Canadian, Texas. He was interested also in several other Texas papers and was prominent throughout the state in newspaper channels. In 1908 he was responsible for the organization of the Panhandle Press Association, which is said to be the largest district press association in the United States. He became associated with the Doherty interests in Texas some years ago and after a short period of service with the Doherty organization in the state of Texas was transferred to the New York office in what is known as the Customers' Ownership Division of the securities department. In 1924 he went to the Colorado company as advertising and publicity counsel. Mr. Jamison has had wide experience in organization work. He will have headquarters in Denver under the new appointment.

F. R. JAMISON

F. G. Philo, formerly with Stone & Webster, Inc., with headquarters in Boston, has joined the staff of the Southern California Edison Company, Los Angeles, as assistant superintendent of steam generation in charge of the Long Beach steam plant. While with the Stone & Webster organization Mr. Philo was preliminary operating engineer, a position which required that he keep in close personal touch with the final stages of construction of steam plants and take charge of the initial stages of their operation.

B. C. Rowley, manager of the Edison Electric Appliance Company, Inc., of Salt Lake City, was among those who attended the convention of the Rocky Mountain Division of the N.E.L.A. at Glenwood Springs, Colo.

R. E. Fisher, vice-president in charge of public relations and sales, Pacific Gas and Electric Company, has returned to San Francisco after an extended trip through Eastern manufacturing and financial centers.

S. H. Taylor, secretary, Pacific Coast Electrical Association, San Francisco, has returned from Chicago where he attended the meeting of the executive committee of the N.E.L.A.

T. S. Wood, Northwest representative of the Packard Electric Company, Warren, Ohio, has been elected vice-president of the Electric Club of Seattle.

L. B. Gowan, of the Lighting Service Bureau of Salt Lake City, attended the Illuminating Engineering Society convention held recently at Cleveland, Ohio.

Harry Farquhar, formerly with the Oakland works of the General Electric Company, and **John W. Massie,** formerly with the switchboard department of the General Electric Company, have formed a partnership under the name of Electrical Repair & Equipment Company in San Francisco.

K. C. Schluss, formerly superintendent of power and equipment of the southwestern district of the Puget Sound Power & Light Company, Tacoma, Wash., has been promoted to be general superintendent of the Western United Gas & Electric Company, Aurora, Ill., a company managed by Stone & Webster, Inc.

C. L. Hill, formerly assistant superintendent of power of the southwestern district of the Puget Sound Power & Light Company, Tacoma, Wash., has been promoted to be superintendent of power, taking the place of **K. C. Schluss.**

J. H. Fenton, manager industrial division of the Los Angeles office, Westinghouse Electric & Manufacturing Company, has returned from Seattle where he attended a conference.

Fred Hazard, formerly in the washing machine business in Denver, has been named manager of advertising and sales promotion of the Servel Corporation with headquarters in New York City.

G. W. Hamilton, turbine engineer, Westinghouse Electric & Manufacturing Company and a member of the Los Angeles office for the past two years, has been transferred to the Chicago office and will take up his duties there shortly.

L. C. LaMont, office manager, Westinghouse Electric & Manufacturing Company, Los Angeles, recently spent some time in the Phoenix office of the company.

G. A. Riley, assistant superintendent of distribution, Los Angeles Gas and Electric Corporation, Los Angeles, will head the overhead systems committee, P.C.E.A. Technical Section, for 1925-26.

T. J. Gibson, formerly of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, is now in Los Angeles, having assumed the duties of manager of the Westinghouse Acceptance Corporation in that city. **K. C. McMasters,** formerly assistant to **L. P. Lee,** treasury representative, has been made assistant to Mr. Gibson.

F. R. Kohnstamm, manager of the appliance department, Mansfield Works of the Wesinghouse Electric & Manufacturing Company, recently was in Los Angeles on a short business trip.

J. G. Stuart, with the Pacific States Electric Company, Seattle, was a recent visitor in San Francisco.

J. M. Buswell, who has been named chairman of the accident prevention committee of the Technical Section of the P.C.E.A. for the second year, is especially well fitted for this post. He is particularly interested in safety work, and it was primarily through his efforts that the committee was organized and accepted as such at the beginning of the fiscal year 1924-25.

J. C. Gaylord, of the engineering department, Southern California Edison Company where he is engaged in substation design and layout work, is the new head of the electrical apparatus committee of the P.C.E.A. Technical Section.

Walter Dreyer, assistant engineer, division of civil engineering, Pacific Gas and Electric Company, San Francisco, has been appointed chairman of the P.C.E.A. Technical Section's hydraulic power committee. Mr. Dreyer was connected intimately with the hydraulic developments of the company's Pit River project.

R. E. Jones, head of the meter department, The Southern Sierras Power Company, Riverside, Calif., has been appointed to the chairmanship of the P.C.E.A. Technical Section's meter committee.

R. L. Wood, Utah Power & Light Company, Salt Lake City, recently visited the Pacific Coast, spending some time in San Francisco.

L. B. Gawan, of the Lighting Service Bureau, Salt Lake City, recently attended a convention of the Illuminating Engineering Society in Detroit. He also spent some time visiting the laboratories of the National Lamp Works in Cleveland where new developments in lighting were on display.

J. G. Rollow, consulting engineer, Los Angeles Gas and Electric Corporation, Los Angeles, is vice-chairman of the executive committee of the P.C.E.A. Technical Section.

E. G. Miller, recently elected treasurer of the Southern California Edison Company, Los Angeles, has made a rapid rise in the public utility world. Less than ten years ago he joined the Southern California Edison Company in the accounting department. From there he went to the insurance department and then to the secretary's office as assistant secretary. His grasp of financial problems paved the way to his appointment as acting treasurer early in 1925. His election as treasurer followed as a natural consequence.

E. G. MILLER

H. W. Crozier, of the Federal Light & Traction Company of New York City, recently made an inspection trip through the Grays Harbor and Olympic peninsula district in the state of Washington, for the purpose of gathering information on the hydroelectric possibilities of the region. The Federal company is the parent organization of the Grays Harbor Railway & Light Company, operating in Aberdeen and Hoquiam, and contemplating large power developments on the Olympic peninsula. Mr. Crozier was accompanied by **G. L. Parker,** district manager of the United States Geological Survey.

H. E. Barden, who has been connected with the Southern California Edison Company for fourteen years in an engineering capacity, has resigned to accept the position of district representative of the Pacific Coast Building-Loan Association in the Santa Monica district.

H. V. Busby, chief clerk in the Compton district of the Southern California Edison Company, has been transferred to the corresponding position in the Santa Barbara district. His successor at Compton has not yet been named.

D. W. Chamberlain, of the Globe Electric Company, Seattle, has been appointed treasurer of the Electric Club of that city to succeed **E. A. Irons** of the Westinghouse Lamp Company, who recently resigned. Mr. Chamberlain also becomes a member of the executive board of the club.

W. R. Mathews, formerly of the engineering department of The Washington Water Power Company, Spokane, has been appointed illuminating engineer to function in the commercial department under Lewis A. Lewis, sales manager. Mr. Mathews was born in Minnesota in 1898, but his family soon moved to Spokane where he went through grade and high school. After two years at Washington State College, Pullman, he went to the Massachusetts Institute of Technology, Boston, graduating in 1921 with the degree of B.S. in electrical engineering. He supplemented this education with one year's graduate work, taking an M.S. in 1922, and also completed the student engineering course of the General Electric Company. Returning to Spokane, he entered the employ of The Washington Water Power Company in the engineering department. In December, 1923, he was transferred to the commercial department as illuminating engineer.

W. R. MATHEWS

W. A. Brackenridge, senior vice-president of the Southern California Edison Company, Los Angeles, was a recent visitor in San Francisco.

A. H. Tracy, with the Byllesby Engineering & Management Corporation, Chicago, recently spent a few days in San Francisco.

J. E. Kewley has been appointed general manager of sales for the The National Lamp Works of the General Electric Company, Nela Park, Cleveland, Ohio, and **T. K. Quinn** has been made assistant general manager of sales. **W. G. McKittrick** will be manager of the sales department, which hereafter will embody under this one head what was previously two departments, one covering large lamp sales and the other miniature lamp sales.

C. D. Wilson, electric battery and service dealer of 1717 W. Sixth Street, Los Angeles, has been appointed local representative of the Elwell-Parker electric industrial trucks and tractors distributed by the Ira G. Perin Company of San Francisco, who are Pacific Coast distributors for the Elwell-Parker Company.

W. P. Bear, formerly with the Magnavox Company, Oakland, has become associated with the Pacific Gas and Electric Company, San Francisco.

G. I. Drennan, formerly traveling inspector for the Pacific Power & Light Company, Walla Walla, Wash., has been made field superintendent for that utility.

L. J. Brown, formerly assistant sales manager of the Western Electric Company, San Francisco, was appointed stores manager of the San Francisco office effective Oct. 1. **P. W. Todt,** formerly stores manager for the same company in San Francisco, has been transferred to the Los Angeles office as stores manager.

P. S. George, manager of the commercial department of the Coast Valleys Gas & Electric Company, Salinas, Calif., attended the meeting of the California Association of Electrical Inspectors which was held recently in Fresno. **S. F. Butler,** city electrician of Salinas, made the trip with him.

D. W. Proebstel, electrical engineer, light and power department, Portland Electric Power Company, Portland, lately visited San Francisco and Los Angeles and other power centers.

H. G. Steele, president, and **Carl Johnson,** vice-president, respectively, of the U. S. Electrical Manufacturing Company, Los Angeles, were recent visitors in San Francisco.

A. S. Merrill, general sales manager, Appleton Electric Company, Chicago, has lately returned from a trip to the Pacific Coast where he called on the branch offices of the company in Los Angeles and San Francisco. He also visited Seattle where he established a new office at 71 Colombia Street, which will be under the direction of **C. H. Shoemaker.**

Carl W. Wiggins, superintendent of electric production, San Diego Consolidated Gas & Electric Company, San Diego, Calif., returned a short while ago from a trip to Chicago, Minneapolis and St. Paul. In the latter city he attended a convention of the National Association of Stationary Engineers. In Minneapolis he visited **H. H. Jones,** former president of the San Diego company and now vice-president in charge of operation, Northern States Power Company.

Arthur Prager, who is serving as first vice-president of the Rocky Mountain Division, N.E.L.A., and who will assume the presidency July 1, 1926, as a result of his election at the recent Glenwood Springs convention, is the manager of the Albuquerque Gas & Electric Company, Albuquerque, N. M., a Federal Light & Traction Company holding. Mr. Prager was born in Trinidad, Colo., in 1890, and attended the public schools in that city. After graduating from high school he started his business career with the Trinidad Electric Transmission, Railway & Gas Company as a meter reader and collector. In 1910 he was appointed auditor of that company and also had charge of the accounting departments of other Federal companies, including the Albuquerque Gas & Electric Company, Deming Ice & Electric Company, Deming, N. M., and the Springfield Gas & Electric Company, Springfield, Mo. He was named manager of the Albuquerque company in 1917 and resigned to enlist in the army. Starting as a private he was discharged with the rank of major, returning to Albuquerque on Jan. 1, 1919. Mr. Prager formerly served as a vice-president of the Rocky Mountain Division N.E.L.A. and is a past president of the New Mexico Electrical Association.

ARTHUR PRAGER

Obituary

Thomas Franklin Manville, chairman of the board of directors of Johns-Manville, Inc., died Oct. 19, in New York City. He was one of the country's great business builders. For the past twenty-five years he has been the directing head of Johns-Manville, Inc., the world's largest producers and manufacturers of asbestos, and during that time he has built up an outstanding organization fully capable of carrying on his plans and policies. Mr. Manville was president of the Arizona Asbestos Company, treasurer and director of the Asbestos Wood & Shingle Company, president and director of the Canadian Johns-Mansville Company, director of The Fibre Corporation, director of the Fifth Avenue Bank, and trustee of the Franklin Savings Bank.

TRADE NOTES

W. N. Matthews Corporation, St. Louis, Mo., has revised all price and discount sheets covering its line of electrical specialties. Many reductions in prices have been announced.

Detroit Stoker Company, Detroit, has issued a new 32-page bulletin describing the Detroit underfeed stokers of the single-retort type. The bulletin also contains a number of fuel bed cross-sections, showing conditions of the fire with respect to air distribution and movement toward the dumps.

General Electric Company, Schenectady, has issued recently a new booklet entitled "Planning and Judging Street Lighting." The book is illustrated with photographs showing new types and designs of street lights.

Harold E. Trent, Philadelphia, Pa., has placed a new soldering iron appliance on the market, which it is claimed has the ability to heat up to soldering temperature and to maintain such a temperature indefinitely.

Brown-Instrument Company, Philadelphia, has issued catalog No. 74, which describes and illustrates the Brown recording pressure and vacuum gages.

Hynes & Cox Electric Corporation, Albany, N. Y., has issued a folder descriptive of its electric glue pot, which it is claimed has many advantageous features.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has placed on the market recently a new and complete line of 25- and 60-cycle squirrel-cage and slip-ring induction motors equipped with Timken tapered roller bearings.

The Electrical Engineering Service, New York City, has issued a circular describing a new instrument which it is claimed is an improvement in the measurement of electric current. It is called the Avotester, derived from ammeter, voltmeter, ohmmeter in one.

The Hisey-Wolf Machine Company, Cincinnati, has issued recently Bulletin No. 107, describing and illustrating the latest Hisey electric drill, equipped with a standard Hisey motor.

P. E. Chapman Electrical Works, St. Louis, Mo., has issued recently bulletin No. 120, giving a description with prices and illustrating its taping machines.

Goheen Corporation of New Jersey, Newark, N. J., whose New York office is at 331 Madison Avenue, has issued a new folder on Galvanum, its special paint engineering product for painting galvanized iron. Galvanum, which has been on the market for over thirty-seven years, is claimed by the makers to be particularly suitable for industrial buildings, sheds, warehouses, garages, and all other galvanized iron buildings.

H. J. Gute & Company, San Francisco, will handle the Blendon-Dun line of violet-ray machines on the Pacific Coast and in other western states.

Johns-Pratt Company of Hartford, Conn., has removed its New York office from 41 East 42nd Street to Room 610, 20 Vesey Street.

Sandoval Sales Company, San Francisco, distributors of Wesix electric air and water heaters, has opened a branch office at 4536 Hollywood Boulevard, Los Angeles, from which it will handle the sale of Wesix products in southern California, Arizona and New Mexico. C. B. Merrick, formerly sales engineer, San Joaquin Light & Power Corporation, Fresno, Calif., has been made district manager.

I. S. Cohen Sons, formerly located at 1015 Market Street, San Francisco, has moved to a 3-story and basement building at 1023 Market Street, that city.

C. F. Bulotti Machinery Company, San Francisco, has moved to enlarged quarters at 829-831 Folsom Street. The firm handles machine tools and railroad supplies.

Appleton Electric Company, Chicago, has established a new office at 71 Colombia Street, Seattle, in charge of C. H. Shoemaker.

Cecil R. Lambert Company, Detroit, has issued a brochure on conveyor applications, which it is claimed should be of interest to every executive who wishes to lower his material handling costs.

The Automatic Transportation Company, Inc., Buffalo, has developed a new lamp known as the Helen Carr lamp, which it is claimed is unique and practical, being a combined lamp and clock of attractive construction.

Delta-Star Electric Company, Chicago, has issued a new publication devoted to high-tension bus supports. There are 48 pages and 119 illustrations. Detailed dimensions of supports up to and including 120 kv. are given.

General Electric Company, Schenectady, recently has issued a pamphlet containing instructions for installing and operating metering outfits. The book also contains diagrams and illustrations.

Servel Corporation, New York City, has taken over the nineteenth floor at 51 East 42nd Street, in addition to the space occupied at 17 East 42nd Street, which will be given over to the mechanical and production departments of advertising and sales promotion in electrical refrigeration.

Edison Electric Appliance Company, Inc., Chicago, has produced a new 6-lb. laundry iron equipped with the Hotpoint sheath wire unit which the company claims is the most serviceable laundry iron built and heats up more rapidly than the ordinary iron.

The Crocker-Wheeler Company, Ampere, N. J., has announced a change in its name. The company is to be known as The Crocker-Wheeler Electric Manufacturing Company.

O. Zernickow Company, New York City, has issued a new circular of its O-Z Laboratory timer stop watch, which it is claimed embodies important improvements in design.

Electric Railway Improvement Company, Cleveland, has issued recently circular No. 12, entitled Electric Weld Rail Bonds. Circular No. 14, another recent issue, covers its portable arc welding outfit for mine service.

Chicago Fuse Manufacturing Company, Chicago, has issued an eight-page pamphlet describing and listing the ferrule contact and knife-blade contact "Union" renewable fuses.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, has issued recently a bulletin covering a new line of automatic percolators and describing the application of the disc-type thermostat to percolators.

The Automatic Transportation Company, Inc., Buffalo, has issued a folder which illustrates and describes the advantages of the company's electric heater in its improved design.

Pittsburgh Transformer Company, Pittsburgh, has issued bulletin No. 2048, which contains in condensed form the test and connection diagrams that were published originally in its larger bulletin under No. 2045. This smaller bulletin contains much valuable information which should be of benefit to engineers and operating men and is published in a convenient pocket form.

Some of the members of the advisory board of the Electrical League of Denver "warming up" just prior to the Laughing Contest featured exclusively for them at the League's fifth annual picnic. As will be noted, two of the members were "going good" when the picture was taken. These personages were none other than W. R. Kaffer, chairman of the afternoon sports committee, and A. C. Cornell, chairman of the League, who can be identified only by his height and white trousers. Those standing in line, left to right, are: O. L. Mackell, John J. Cooper, Ernest P. Kipp, E. C. Headrick, A. E. Bacon, F. F. McCammon, W. R. Kaffer, K. L. Francis, A. C. Cornell, D. D. Sturgeon, S. W. Bishop, manager of the League; L. M. Cargo, V. N. Garretson, and W. A. J. Guscott. McCammon's Scotch brays are said to have put him in a class by himself in qualifying for the prize.